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THE NATURAL GEOGRAPHICAL REGION *

By A. Stevens, M.A., B.Sc.

The most conspicuous geographical concept whose enunciation is associated with British geographical thought is that connected with the phrase, *Natural Geographical Region.* In spite of much—rather sporadic—discussion, the concept remains obscure. Many who would like to employ the term are shy of it : they shorten it to *natural region*, and some limit the meaning of the epithet *natural* to the physical, the inorganic ; they distinguish the geographical region ; they refer to economic, to " human use " regions. All this hedging about terms is a sure indication of uncertainty of grasp as well as of diversity of view. And yet, if the concept were clear and well defined, and recognised as the fundamental object of geographical study, a foundation would be laid for one real school of British geographical thought in which many, if not all, could find ground for co-operation.

Search in the writings of Herbertson reveals the idea as a conceit rather than a concept, if we may revive a distinction fast becoming obsolete. It is true that the main force of the master's teaching is not to be found in his written word, and regrettable that his germ of thought seemed to miss a medium in which it might have developed to fruition. If not he, then some of his disciples were caught up in the momentum of the pendulum swing away from the use of political divisions as regional units, even when realising that the most satisfying examples quoted as natural regions showed human, and in some cases a kind of political, unity as their real index. The major natural regions which Herbertson defined were, as is well known, essentially climatic regions. But a belief that in similar natural regions the course of human development might be expected to follow similar lines first becomes explicit in work by one of the Oxford school in a paper of 1927 by Roxby.

The concept is associated with the normal indications of inevitableness and universality. We need not search for its Lamarcks and Erasmus Darwins beyond the days of Ritter. Hettner in

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Germany and Vidal de la Blache in France converged in thought with Herbertson. In practice the French seem to us to work on the sounder lines : they are happy and fortunate within the limits of their *pays* so long as they have sufficient traditional knowledge to guide their selection of region. They have not, it appears to us, adequately examined the basis of their limited success. The Germans, on the other hand, have gone most thoroughly along the same path as we, but far less falteringly. To *Landschaft* they have added *Kulturlandschaft,* employing the German vernacular in two different senses in a pair of related terms. Would their risibility have withstood the step of consistent thoroughness to *Kulturland* and *Kulturerdteil* ?

The term originally used by Herbertson was *natural geographical region.* In most writing the middle word is dropped. Roxby says that a natural region is characterised by a particular set of *physical* conditions. We quote him, not because he sins more heinously than the rest, but because he thinks clearly and writes better than most. But a uniform set of conditions is hard to find extended over a region of any considerable area. This is to be expected, of course : in a sufficiently small region one would find uniformity, or " practical " uniformity, but in a large one it is necessary to search for unity within diversity. For large areas the " dominant " physical condition becomes the criterion. Herbertson regarded climate as dominant in the characterisation of his major natural regions of the globe, and this lapse in logic evoked serious criticism on the occasion on which he first propounded his views. The criticism was as immature as the thesis. No one, so far as we know, has entered on a systematic consideration of the geographical relevance of the various physical conditions, and an examination of this relevance would seem an essential preliminary to the establishment of dominance. Such occasional—and usually disingenuous —flirting with the question as occurs would indicate what is probably true, that any attempt in this direction is, in practice, hopeless.

Assuming the existence of a natural region in the physical sense, the obvious method by which it is to be determined is to plot on a series of maps, each for a single category, all the physical characters. By superposition of the series the natural region would be defined. It is perhaps occasionally possible by this method to get a " core " of uniformity surrounded by a margin of greater or less extent where the primary distributions overlap. We accept without difficulty the conclusion that natural regions have not, as a rule, definite boundaries, but are separated by " areas of transition," and we suffer without undue discomfort the inconvenience of the indefinite. We should do better to consider whether it is not to be concluded that regions so " determined " are unnatural and the procedure uninformed.

The usual kind of regional treatment follows a similar method. The various categories of physical facts are described, and frequently

they are analysed as if they were, from the point of view of geography, facts-in-themselves, and not relevant merely in a special connection. The orderly succession proceeds from geological structure through climate to technology, with varying emphasis, but little evidence of any principle of selection. There may follow or be interjected some description of flora and fauna. Then there is an abrupt change to " human " matter, which may be pure demography or pure ethnography or a mixture. But the relation of this epilogue to what precedes is obscure. The reader has presented to him no picture of an organised whole ; he has a detailed description of the same graphic value as a full census of the composition of a forest. The place for such matter is a pigeon-hole, its function the amassing of dust.

The ultimate fallacy underlying this kind of thought or procedure is that it begins by assuming a duality, the physical and the non-physical, the human and the non-human, the natural and the artificial. It brings geography to the stage reached by the Schoolmen when they disputed between form and matter, matter and spirit, and questioned the possibility of knowledge. We are not concerned about absolute knowledge or complete knowledge, but only about a particular kind of knowledge and only about the attainable extent of that. We are concerned with physical and biological nature only in so far as it may be regarded as human environment, and only with man in so far as he has demonstrable relationships with the environment.

Many will agree well enough with this last statement, but some, if not all, will insist that the method of geographical study is a synthesis or an integration. The Germans regard the *Landschaft* as a member of the *Land* and the *Land* as a component of the *Erdteil*. Among English writers Unstead is identified with something similar. But Unstead seems to regard natural regions of a certain order as more or less infinitely divisible, and he builds up larger regions from units to which he applies the term *Stow*. It is easy to see that he may achieve a good deal of physical uniformity by taking his unit area so small, but it is difficult to see how he can achieve anything in the way of positive unity. To add physical units is, in any case, not to perform either an integration or a synthesis. The absence of cohesion in so many " synthetic " geographical accounts, the failure to present anything resembling a finished composition, is sufficient comment on the success of geographical " synthesis " in present practice.

Synthesis is not addition : it is a complex process for which there are no general rules. The chemist performs it successfully, but in special and individual cases. The mathematician is our best integrater. He may begin with a function of x and is as likely to end with a new branch of mathematics as with a reasonably simple new function of his variable. Neither can operate with dissimilar things. You cannot integrate man and his environment.

I suppose something analogous to synthesis might be said to go on between man and his environment. If this analogy do not lead us astray once more, we might say that man is the synthetic influence. History is a spectator of the process, more or less blinding itself to everything but the time element. The geographer does not synthesise, because he cannot, but he also is a spectator of the process primarily interested in its development in space. Man must be looked at objectively by the geographer and even his significant antics must be taken to be as natural as the physical environment. The natural geographical region is a result of what, for want of a better word, we may agree to call synthesis proceeding in nature, under our eyes, but not by our voluntary action. There are two aspects of this synthetic product : the environmental aspect, essential to which is man himself, and the human aspect, which is much the same as to say the functional aspect, using the language of ecology. Dissociation of these has led geographers to attempts for which they are not qualified and certain unqualified students to call themselves geographers. " Geography," a biological colleague used to say with reason—" what is geography ? We all teach geography."

For these two aspects of the same thing there are convenient names, but it is essential to remember that coherent geography must regard them as indicating mere aspects of the same thing. The one is *region*, and it focuses attention on the environment as space. The other is *community*, and it indicates that special attention is to be paid to the functioning, or dynamic, aspect of the case. The natural geographical region must be defined by reference to both. Otherwise it is necessary to drop the *geographical*. The physical region of " uniform " or " dominating " physical characteristic may interest the topographer (in the survey sense), the climatologist, the pedologist. It is an irrelevance in geography.

With natural perversity various writers have seemed to approach this way of thinking and shied away from it. For your iconoclast is but the prophet of a different idol and nihilism is but the technique of the quack vendor of another political nostrum. The too enthusiastic, and the disingenuous, thinker, each has a fatal attraction to the false analogy and the undefined term. We must inquire what may legitimately be meant in the language of geography by the totality, the unity, the functioning and the evolution of the natural region. As to the first, there are some innocent souls who take it absolutely. Encyclopaedism died with Diderot : we may leave them to their quest of All Knowledge. Unity within diversity, active functioning, progressive evolution are all to be associated with an organised whole, and it is this organism we have to seek. Let us embark on the perilous sea of Analogy : with due consideration of the uninsurable risk of this kind of navigation.

The naturalist is familiar with the idea of an organism growing in a suitable medium and so permeating it as to produce an in-

divisible whole of organism and environment. Hear the parable of the gardener transferring to a suitably small pot of compost a seedling he is " bringing on." In course of a remarkably short time the whole pot of soil is invaded by roots, but the plant-pot-of-soil remains a growing and perfecting synthesis until there appears clear evidence of distress in the seedling and roots begin to emerge from the soil. The system has then reached a stage of decadence and must perish and be succeeded by some other. But had the pot been stood in the garden, and not separated from all continuity with soil, while the roots were still in a state of rampant growth, and long before the pot-bound condition was reached, they would have pushed out through the drainage hole, and at the cost of some energy and inconvenience the system would have been extended in space and in time. On the other hand, had a tiny plant been set in a nine-inch pot, long before it had grown into competence to deal with its accessible medium the greater part of the soil in the pot would have been " soured " and again extinction would occur, prematurely. Let it be noted that while the gardener's most active interest is in the pots that contain his plants, he is not indifferent to other pots or other soil which in the future he may come to use. He stops short of becoming a pedologist before he dare plant a lettuce, of considering the processes of weathering before he throws out his exhausted or soured soil for nature to deal with.

The natural geographical region must be an organised region. The organising agent is the human community : community and region are but aspects of the same organism. It may be suggested that the morphology of this natural geographical region is the interest of geography—its morphology as a whole, not its histology, and not directly its physiology. Quite outside the subject lie those studies such as geology, geomorphology and climatology, which deal purely with the environment and have proper dynamic problems of evolution or change. Without it lie also those studies which are concerned with man, the individual or the community. The limits dividing these disciplines from the geographic must be clear-cut. History alone seems impossible absolutely separate from geography. The besetting sin of the geographer who trespasses is the adoption of the alien point of view.

The boundaries of the natural region (in our sense) are definite enough ; which does not mean that they are necessarily simple or easy to trace. Where they are common to another natural region they are clearest. These boundaries indicate a state of equilibrium which may be stable but cannot be static. Change may occur in their position or in their condition. The most active normal change occurs when they are advancing unto unorganised or relatively unorganised country. Such advances occur during colonisation. Their tendency is centrifugal, their actual development in space is limited by conditions. Organisation by Rome was more or less regularly centrifugal, the advance of Germanism was eastwards.

The boundaries of a natural region may be indifferent to natural (physical) boundaries. For an organism must have continuity in its medium, but continuity does not preclude variety. So the boundary of a natural region may cross a mountain range, partition a river valley, divide a coalfield. And it may be a better boundary for so doing. The time factor (*relative* time) is important here, for the question of stability, equilibrium, is a question of adjustment. It is no hardship to the economic structures concerned that France, Belgium, Holland and Germany share one coalfield. Their political frontiers antedate their industrial development. For the Romans the Rhine divided, for the Germans it unites, for the French it still separates. The flanks of a mountain range separate and are easily held ; the passes connect.

For Herbertson with his analogies man represented the nerves of a natural region. Not so : man is the living principle. The nature of that principle is not the subject we are called to study. The nervous system, if we must have analogy, is the means of communication in the widest sense ; and the analogy is unduly narrow, for means of communication have nutrient as well as co-ordinating functions. In this place, it is true, we are less concerned with the former, for the purpose is to define the natural geographical region.

The unity of the natural geographical region is achieved, maintained and developed by organisation, by cohesion, and this cohesion is attained and extended by intercourse, at first within and later beyond the region, provided the organic development is an indigenous growth. Since the fourteenth century the means of communication of the type associated with Western Europe has been undergoing continuous but uneven development. This development was stimulated by overseas discovery, but its progress gained speed in the nineteenth century with the concurrent development of railways and large-scale manufacture, and the acceleration has progressively increased until our day. In consequence the range and intensity of organising ability and power have increased. The most satisfactory natural regions to contemplate, and to appreciate from geographical writing, had been fully organised and had their identity recognised before the modern era began. One has but to think of the French *pays*, and the deterioration of the work of such a master as Vidal de la Blache beyond the Paris Basin. No doubt the conservatism of the French countryside and the degree to which it was able for so long to preserve its archaic cohesions has made it a specially favourable field for regional studies. But traces of such a division of the country are not wanting in Scotland. Even in the Midland Valley names like Menteith and Lennox have not completely lost regional content, while names of regional significance are common enough north of the Highland Line. Elsewhere access to extraneous sources of necessities and the means of establishing wider loyalties have obliterated local character and submerged

local unity. What are the *pays* of the Rhone Valley? The speed of modern change has confused a great deal of thought.

Two types of organisation must be distinguished, and we shall call them conscious and self-conscious respectively. The former is primitive and appears less artificial. The latter is very modern. It is a development made possible by progress in general, especially in the knowledge of the possibilities of "planning," and of the "management" of environmental conditions; and in the development of means of communication in particular.

Natural regions must change in extent and otherwise with time, but the changes need not be continuous. At times of specially rapid change in human life the natural division into regions may almost suffer a revolution. But a true revolution, a sudden and catastrophic change, has occurred only in extra-European countries. In North America there must have been natural regions—or, if it is preferable, an analogue of a system of *pays*—of Indian times. The traces of these have been swept away, except what may be gleaned from such knowledge of tribal distribution as has persisted.

The train of thought here presented arose out of consideration of two cases, one of continuous and the other of discontinuous development, Russia and the United States. As we go eastwards in Europe the scale of the current "natural regions" increases, their characterisation becomes looser, the criteria on which their discrimination is based alter. This is explained, of course, by the disappearance eastward of "marked" features, the apparent poverty in variety, and so forth. It is also due to meagreness of information, whether absolute or relative to the individual writer. The division into soil or vegetation belts or into topographic basins and intervening plateaus, or the adoption of the new Soviet administrative divisions may satisfy the botanist, the geomorphologist or the student of administration: they ought not to satisfy the geographer. In Russia it is possible to distinguish very clearly four organisms developing under auspices which may be called indigenous and a fifth stimulated by agencies initially external. To none of these can completely determined frontiers be assigned for a reason which will appear later, but it is evident that these boundaries will pay little heed to the "natural" boundaries we are accustomed to recognise. The regions are respectively that which was Novgorod and now is Leningrad; Muscovy or the Moscow region, which the Soviets subdivide administratively; Kiev;—the traditional division into White, Great and Little Russia, more or less. The fourth is the Central Urals, or the Chusovaya-Ufa Valley region, and, in a sense, is a successor to an older Permia, with which it does not coincide. The fifth may be called the Azov-Black Sea commercial and industrial region, and owes its differentiation to trade in wheat and to Franco-Belgian interest in its industrial materials. It is not really hard to find other natural regions to fill up the country, but their characterisation is less definite and their limits very uncertain.

In the case of North America the divisions customary in regional description are based on criteria mainly of two different orders. They are the topographic regions and the " human-use " regions. Such shifting of ground is not scientifically sound nor is it intellectually satisfying. On the criteria now proposed it seems possible to distinguish in the whole of the United States but two divisions east of the Cordillera : New England, and a region corresponding to the State of Ohio with Indiana and part of Illinois—more or less. Here, as in Russia, is much unorganised territory : in both the regions are more extensive than in Western Europe.

The difference in scale would appear to be due to difference in topographic fragmentation—before due consideration has been given to the matter, as long as we consider the physical more fundamental and permanent. But it is neither. What is fundamental is relativity to man. Space, height, slope, areas at the time unproductive, all these represent difficulties in the problem of instituting and operating means of transport. At the present moment all of them within terrestrial limits have their price in time, labour, ingenuity and risk. If the price is commercially—and even strategically—still too high, the practical possibilities are still of commercial magnitude. It is only a hundred years since the scale of land transport began to approach that of water transport. Crossing the Alps by forces of great military significance was almost as great a marvel in the days of Napoleon as in those of Hannibal. It was less perilous than the invasion of Muscovy. What strength in men and material could be launched across these obstacles of space and altitude to-day ? What " fifth column " of 1940 can be certainly held at bay by the most powerful or secluded or distant people ?

The Natural Geographical Region is an active organism. The size of a region growing freely is determined by the range of the means of cohesion. At a given time that range depends on the state of technical development of the community occupying the region in relation to the problems presented by the nature of the medium. If technical development is relatively stagnant, but territorial development is undisturbed, the " organism " will expand up to boundaries which for topographic reasons, but also, it may be, on account of mere distance, are insuperable at the time. The state of equilibrium so reached in empty, barren or distant areas will be fluctuating. Improvement in the means of communication will produce an expansion of the organism, provided it is free to expand. In a " new " country like the United States, that is, where the history of development is discontinuous, to the expansion of regional units are set the very wide limits compatible with modern means of communication.

Some at least of the commonly recognised regional divisions both of Russia and the United States are represented, mistakenly of course, as regions of monoculture with a characteristic crop

produced under suitable climatic conditions. In fact, the corn belt is as much a region of mixed farming as the dairying belt and there is a great deal of pasture, largely unimproved, in both. The pressure of population on the land is low, and the region-community organism is far from the condition to which the ecologists apply the term *climax association*. A state of equilibrium has not been attained. Two propositions follow from these considerations : the relation between the community is so loose that its activities do not fully reflect the conditions of the environment ; the more intimate and less organisable contacts within the community are so indefinite that what we may call regional consciousness is rudimentary. At the same time what we have referred to as self-consciousness is of an advanced type. The " human use " region, as usually distinguished, is an area of undeveloped economy. The natural geographical region emerges from chaos only when it has evolved to the stage at which it can be clearly recognised as a synthetic whole with what the French would call " personality." When this stage of climax association has been attained we are able to assess the relative significance of environmental (physical and other) factors ; for this cannot be done satisfactorily except by using the nature and activity of the community as an index in the same way as the natural vegetation of a region has been employed as a climatic index. The climax condition when it has been attained is not necessarily permanent. It may change with greater or less rapidity in time, and the obvious reasons for change are human progress, chiefly technological, or the reverse, and exhaustion of resources, notably mineral resources, absolutely or due to alteration of values.

I do not know whether Russia ever reached a " climax " condition. If we think of the shortness of modern Russian history as such and of the slowness of progress towards the condition aimed at now, we might easily think not. Pressure of population on the land was certainly locally heavy, but perhaps in general light. Even here there is a doubt, because there is a factor in intensity of pressure on the land other than mere size of population : what is demanded of the land, economic level. Isaiah Bowman held the view that grain export from Russia went on in spite of grain deficiency, and even the Soviets found it necessary to work on the principle enunciated later in a different application as, Guns before Butter. The spasmodic entry on the strait and narrow road to a paradise made in the image of Chicago has so altered Russian circumstances that the conclusions we have reached in regard to the United States may apply in the case of modern Russia also ; though this does not imply that the two are at the same stage in the progress to synthesis.

In the more westerly parts of Europe the centrifugal processes were propagated from a number of centres during the course of development to present conditions. Through a great deal of it

something like climax conditions were reached before the railway era, and to these conditions belong the French *pays* and the German *Gau*. Such entities occur east of the Rhine only within the sub-Hercynian belt of dense population, and not throughout the belt. In the extreme west they expanded territorially up to natural limits which, being narrow, kept them small. Had these close natural limits been wider the *pays* would have been limited by the advancing peripheries of other organisms and conflicts would arise which would be stilled only by coalescence into larger organisations by one of the methods known to history. Indeed the *pays* as we know it is no doubt a product of coalescence : as the smallest organism of the type available for study, it may, merely for convenience, be regarded as indicating the practicable minimum. In areas more remote from the influences active in Western Europe, and to the east in particular, slower progress in indigenous technology, greater obstacles to cultural importation, and correspondingly less rapid growth in population, absolutely and in relation to the extent of available territory, deferred to a comparatively recent date the attainment of the climax condition. The broader fragmentation of the country was a concomitant, but not at all necessarily the dominant, determinant of the territorially larger organism.

Long before the railway era France and Great Britain had achieved the more self-conscious organisation of the nation-state by coalescences of various kinds. The process was less satisfactory in Spain. All three were able to relieve the unease to which increasing efficiency of means of communication made them liable by overseas adventure keeping step with that growing efficiency. The relief was illusory in the case of Spain. Germany had respite of a similar kind because she had her colonial area to the eastwards, and there she still has colonial spaciousness even within her present restricted bounds. In that direction also lie some of her deracinated offshoots, as others share the United States with ours and the French are to be found especially in Canada.

It is suggested that the European nation-state is a community occupying a natural geographical region as its immediate environment, because it is a natural growth limited by its geographical circumstances. Not only so, it is an organic phenomenon so characteristically European in its genesis, to be found nowhere else in a state of mature development ; and therefore any European geography which failed to take account of it, indeed of which it was not the central object, ought to be unthinkable. If the real natural region for geographical study is as we have held, and if the nation-state-country organism of Europe is the achieved synthesis of European geography, then the region which is characterised by a set of physical attributes is, geographically, a misconception. For not only have many European states partitioned one of the main " natural divisions " of the continent, but it is unthinkable that any one community could develop that area as a whole and

remain restricted to it. We refer to the North European Plain ; but there have been attempts enough to unify the " Mediterranean " region, and there is sufficient division now and throughout historic time both there and in the Alpine region, where physical conditions favour severance rather than unity, to justify the same statement with regard to them. Physical conditions are neither more permanent nor more fundamental in geography than human. If in themselves they change less quickly than the characters of the living partner in the symbiosis, their significance and value changes rapidly, even suddenly, and sometimes disappears. And we do not really believe in the permanence or significance we predicate. For we approve and wish to maintain the further political subdivision which has taken place so recently in the North European Plain, we see reason in the demand for access to the sea or to a navigable river, but we boggle about allowing more than one nation access to a coalfield.

These views bring geography nearer to reality, nearer to a real task, closer to the " man in the street." They bring it back to earth and make it—and the services of its devotees—marketable. In these trying days when every effort is required to understand and deal with perplexing problems it does not seem that, at least in this country, geography has made, or shown much sign of ability to make, a due contribution to the common effort. It will not so long as students of geography can gravely read a statement with regard to the subject such as this : " Geomorphology together with climatology in its widest sense . . . appear in fact to constitute at least half of the legitimate field of the subject." What might be the fore (or after) end of this heraldic monster ? If the geographer contents himself with doing with 25 per cent. of normal efficiency what is legitimately done by geomorphologists and climatologists, and *pro rata* with regard to any other disciplines in which he may consider himself free to dabble, can he claim to have a function of his own, and can he be regarded seriously ?

The study of the natural geographical region in being and in development offers the possibility of making in fact that contribution to human well-being which is claimed by history and can never be made by history alone. It offers suggestion, perspective and balance to those who have the conduct of affairs. In dealing with new countries its task must be to follow and understand evolution in progress at a given time. In older lands it is concerned with problems similar to those involved in keeping an archaic piece of machinery working as smoothly as may be. But it is also concerned with the necessity for renewals and for modernisation without the possibility of wholesale scrapping. The nation-state is certainly a synthesis, whether one is willing to call it a natural region or not. It is the major unit of Europe, of whose nature and working we must give geographical account. We must distinguish within it its members and understand their several

natures and functions. These are the proper minor natural regions. *Pays* and *hoc genus omne* are archaisms, primarily the concern of the geographer with archaeological leanings, the historical geographer, without whose services any balanced regional morphology would be impossible. And regional morphology of the actual functioning geographical individuals of our time and of their members is the contribution towards human well-being required of geography.

We see the countries of Europe as natural regions, natural because they exist as phenomena demanding study with a special urgency in these days. Their territorial development seemed to have culminated before the war of 1914-18, and before the present unrest it underwent readjustment which seemed to offer some prospect of stability. We must look for objective explanations of failure. These states grew into contact with each other and organisation permeated the whole of, or the more " European " part of, the continent. Not natural boundaries, but convergence of organisms set limits to expansion, especially for the later developed units. The proper scale of organisation is no longer represented by the European nation-states but rather by the United States. Disturbance of equilibrium shows itself by unrest in the newer countries which have not been disciplined by long confinement within narrow bounds and had their views of hegemony chastened by such a loss of territory and influence as the French suffered in the complete rape of an earlier empire, and the British in the loss of their earlier colonies in America. For the countries east of France the region of colonial expansion has been continuous with the homeland ; the peoples of slower development whom they have replaced have been Europeans and have survived the disturbance of colonisation. These countries do not appreciate the barbarity of applying in 1939 the moral principles applied by others in ruder times two centuries ago.

In Germany we can distinguish extensive areas over which the mean density of population is comparable to that of this country. But to the east, especially, the Reich has extensive areas of relatively recent occupation which we have called its natural colonial region, that which it has in fact exploited, whether of choice or of historical necessity. There the mean density of population is scarce half as great. On the other hand, the former kingdom of Saxony has proved capable of maintaining a mean density twice that of Great Britain. The urgency of any problem of *Lebensraum* is fanciful. And straitness of living space is commonly relieved by more or less free movement of commodities from abroad, compensated by similarly free exportation. Voluntarily or involuntarily Germany has to a large extent renounced this relief. The *malaise* seems by no means untreatable by other means. Germany is sensitive to, if not conscious of, the disproportion between the power to organise and rule and the space to be organised and kept in order. She

believes in a *Mitteleuropa*, whatever theorist denies its legitimacy on " natural " grounds, and with reason. She could not contemplate the possibility of herself having lost the United States as we did. Were her colonies not " stolen " at Versailles, while her acquisitions from Denmark and Poland were legitimate conquests to be made as soon as she had accumulated allies sufficient to deal with the hordes of the Danes and the cohesion of the Poles ? The tenacity with which a view is held is often in direct proportion to its absurdity.

These countries of Europe are on a scale, relatively to each other, to maintain their identity, either individually or in groups, both against natural tendencies and against human enemies ; for the doctrine of the Balance of Power has re-emerged. Their military strength, their means of centralisation and direction, their facilities for developing common " opinion " have all increased with astounding rapidity. They have learned the workings of what we have referred to as the more intimate means of cohesion, and developed the knowledge as the applied science of propaganda for offensive and defensive purposes. There is a part of Germany called the Bay of Leipzig, once a region of corn and beer, now the land of lignite. Here coal tar is abundant and electricity is cheap. Self-sufficiency is a means of security, and self-sufficiency calls for the substitute, the *Ersatz*. We may indicate the function of this region in modern Germany by dubbing it Ersatia. The Ruhr is threatened by the French, Upper Silesia by the Poles, and both are inconveniently marginal. Does Germany see in Ersatia the heart whose beating must be her life ? Czechoslovakia threatens it : her liquidation is imperative politically. There is money in *Ersatz*, especially in war : the industrialists are interested : the step is practical politics.

This is the kind of suggestion which geography can offer for consideration from the study of living geographical entities and their members. The usefulness of the suggestions must be tested by those whose function is to apply them. They require to seek counsel at the oracles of geography and history. Does the cult of the deities receive due and pious attention ?

SOME SHORE FEATURES IN SOUTH-EAST IRELAND

By Archie Lamont, M.A., B.Sc., Ph.D.

" There is a land too dear for a lover's words
Lying beyond the sunset like a dream
In magic slumber, and around her shore
Of cloudy promontories the wandering birds
As spirits of her lovers calling seem
To hang about her still, and evermore
The big waves surge and gulp and surge again
Below the sea-cliffs . . .

Now on the shore the slow-descending light
Touches the whitening ripples as they break
In bubbles against the sand with the flowing tide,
And rouses wild birds up in whitening flocks
Of crying terns and solan geese that go
Through the clear air of this same morning hour
Swooping and plunging."

H. W. Nevinson.

I. Sandspits

To the scenery of Ireland by the sea two elements contribute—maritime cliffs, constituting some of the finest geological sections in these islands, and the wide sandy beaches which the Irish term "strands." This contrast between what is exposed and what is completely hidden might well lead an Irish geologist to share in Lewis Carroll's tears over such "quantities of sand," were not the sand itself so interesting both from the point of view of its movements and from that of the shapes it assumes. The south-eastern Irish coastline is one of submergence. In general, wide shallow valley mouths have been invaded by the sea, while the divides running out between the valleys give rise to promontories which are being attacked by waves and worn back into cliffs. According to D. W. Johnson's definition,[1] this process has reached a stage intermediate between youth and sub-maturity.

In County Dublin, Drumanagh headland (Fig. 1) reaches a height of 56 feet. It consists of hard Carboniferous limestone (D_1—P_1), striking east and west, bounded to north and south by shales (P_2) which weather rapidly by decalcification and abrasion. During the earliest stages of submergence the Loughshinny-Rush coast evidently ran out to sea in a longer point, but whereas hard beds offered resistance to erosion, soft beds did not, so that we find a highly indented coastline which will no doubt be abraded back much farther before a smooth curve is obtained. The beginnings of this may be seen in the long sandy beach that has collected at the mouth of the mature valley north of Rush, whereas at Giant's Hill streams descend steeply and erosion is going on quickly.

The height of the coastal cliffs depends on the original elevation of ridges. Thus the limestones and grits at Portrane stand up in higher cliffs than the igneous rocks, not because they are harder but since they occupy the axis of a divide. This runs west-south-west for 2¼ miles to Donabate, where it lies on an igneous outcrop. The highest cliff at Portrane reaches 63·3 feet. The cliffs east of Malahide are never more than about 36 feet and stand almost in line with the great beach of Velvet Strand, which extends south-south-east into the sandspit ending in Portmarnock Point.

On nearly all sides Ireland's Eye and the former island of Howth are eroded into cliffs. The south-west shore of the former provides an exception to this, while on Howth, south-east of Bottle Quay (Fig. 2), there is evidence of the extension of a spur (the truncated

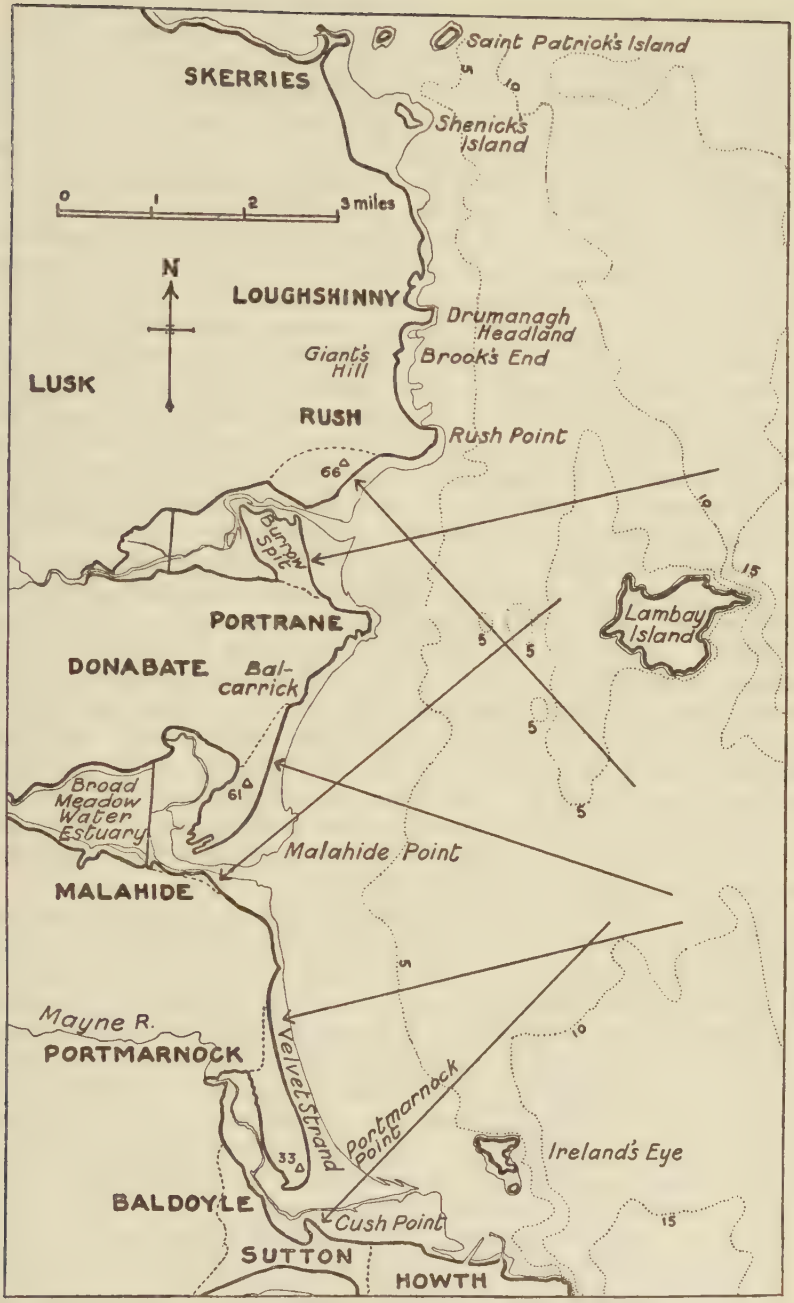

FIG. 1. Sandspits of North County Dublin.
(*Depths in Figs. 1, 2 and 4 are in fathoms.*)

face of which can be seen) south-westward into Dublin Bay. Elsewhere the cliffs have been cut back too far for a ready understanding of the original shape. The cutting can be attributed mainly to the oblique incidence of waves. Likewise the steep cliffs of Dalkey can be explained by the action of wind waves from south-east and east sweeping away detritus as it is eroded. South of the granite promontory of Dalkey Island, on the more destructible Ordovician greywackes of Killiney, however, stretches of sand are being deposited before wave attack from the same directions. We conclude, therefore, that this coast, provided diastrophism does not intervene, must find its mature expression in the erosion of the Howth and Dalkey salients into line with the great sandy beaches.

The coast of County Dublin—and the same is true of County Wicklow—is thus undergoing rapid erosion at headlands and rapid deposition in bays. It is a coastline of considerable geomorphological activity. In the case of the South County Dublin (Fig. 2) and Wicklow beaches, we see at once that they lie at right-angles to storm-waves from the east, with only slight curvature on approaching major promontories. This also applies to the beach at Loughshinny and to the half-mile of sands north of Rush Harbour (Fig. 1). But what are we to make of the orientation of the sand accumulating south of Rush, and of the Burrow spit, which runs north-west from Portrane ; of the sandspit extending from the Balcarrick igneous mass to Malahide Point ; of the North Bull, which was practically non-existent when the first geological map was made, and of the South Bull, which is so much smaller than the North ? All these diverge from the roughly north-south direction of the southern beaches (Figs. 1 and 2). The cause, like that described by W. V. Lewis [2] for the Moray Firth and other areas, seems to lie in the effect of promontories and islands in selecting the storm-waves that sweep in upon different parts of the coast.

In Fig. 1 it will be noted that in the estuary between Rush and Portrane the northern spit is protected by Rush Point from the constructive action of all north-east and most easterly waves. It is, however, fully exposed to storm-waves travelling from the south-east between Lambay Island and the mainland, by which its sandhills have been built up to a height of 66 feet, while its abrupt southern termination is probably due to obliquity of incidence of waves coming in past the north side of Lambay. The Burrow spit, on the other hand, must have been built above sea-level by east-north-east storm-waves, as it is protected from south-easterly waves by the Portrane promontory, and to some extent from easterly maximum waves by Lambay. The parts of the spits close to the waterway between them are affected by the flow and ebb of the tide. That, towards high tide, flow is a strong influence is confirmed by the orientation of the hook on the most recently added part of the Burrow spit.

The sandspit which runs south-south-west for a distance of 2

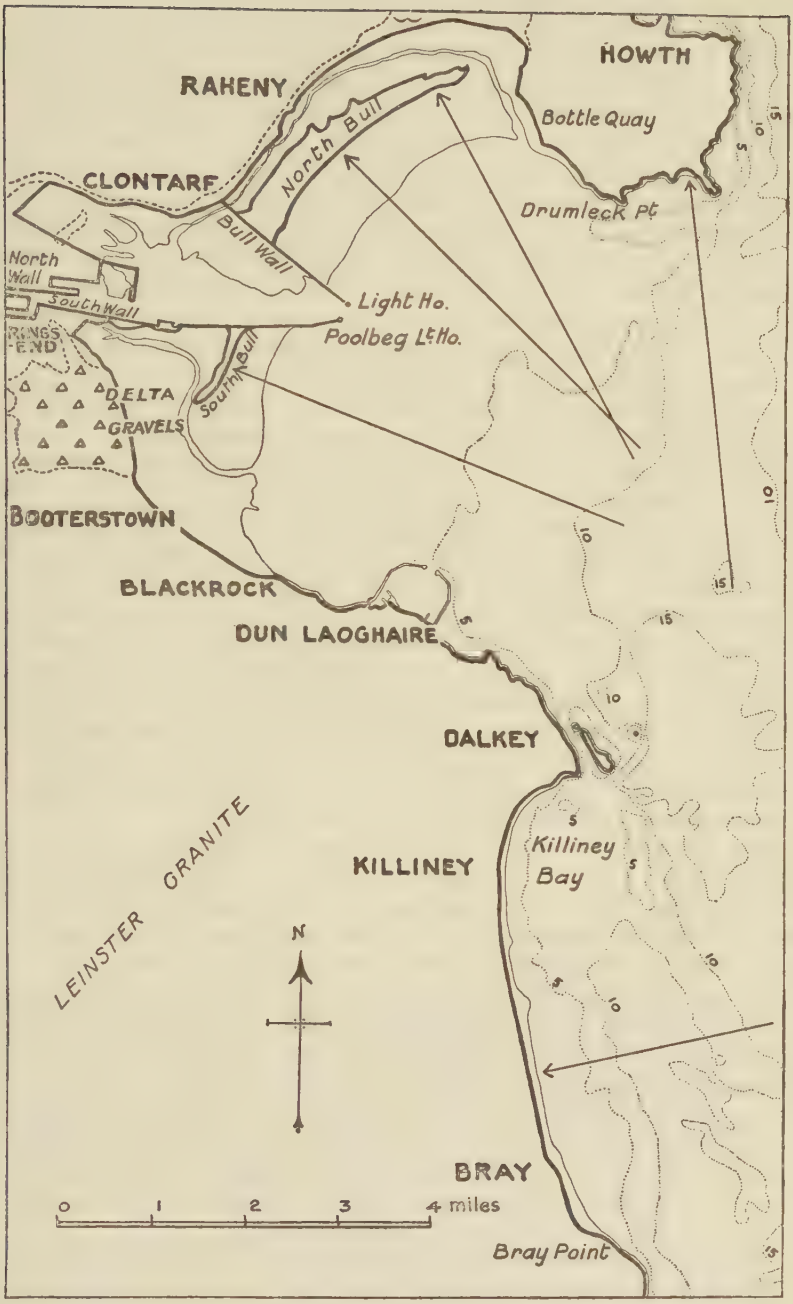

Fig. 2. Sandspits of South County Dublin.

miles from the south side of the Portrane peninsula is beautifully moulded in its northern part in line with the fronts of storm-waves advancing from the east. These are retarded on their northern flank by the Portrane-Lambay ridge, and it is probably also owing to this that the highest point on the sandspit is 1½ miles from its northern end (Fig. 1). The irregular distribution of sand hillocks around this summit of 61 feet points to wind action (*vide inf.*, p. 327).

On the south side of the Malahide estuary there is a small spit of cuspate form. On its seaward side it faces north-east, in which direction there is free approach for storm-waves. This spit is not distinctively coloured on the One-inch Geological Map (Sheet 102), but it, and what appears to be an older one close to the Great Northern railway-line, can be clearly understood from the Six-inch Ordnance Map (Dublin 12 S.E. and S.W.).

Seaward of the spits that lie across the Malahide estuary much sand has accumulated between high and low water marks. Doubtless a good deal of this is collected by intertidal beach-drifting under the influence of small waves. The form of the low water line, however, is attributable to deposition by outflow of the Broad Meadow stream and of water ponded in its estuary, just as the strong inrush of water before high tide has, at successive stages, turned inwards the three distinct hooks in which the northern spit ends. As we go south, L.W.M. fronting the Malahide estuary is found to be almost in line with that of Velvet Strand, which swings round to the south-east parallel to the front of storm-waves retarded by Ireland's Eye and Howth. Here again we find an advance of the low water line, due this time to deposition by the Mayne River, if we may judge from the two " harpoon prongs " which appear on its northern side when the tide is out (Fig. 1).

The increase in length of a storm-wave as it advances into the embayment between Lambay and Howth means loss of energy towards either end where the wave-front is extended most. In other words, the constructive wave is more powerful towards the centre than on either of its flanks. We expect, therefore, the more effective sandspit building to be in the centre of the coastal crescent, and it may be for this reason that half a mile north-east of Malahide Point the sand-hills reach 61 feet, whilst the Portmarnock spit at its highest point near its southern end is only 33 feet, although the sands opposite Baldoyle are more extensive than those at Malahide. For an explanation of the latter fact, I think we must appeal to southward beach-drifting due to prevalent small waves from north-east and east-north-east, and to the vast amount of erosion which has taken place on the northern side of Howth.

The long Portmarnock spit and the small Cush Point spit, which has been developed on the side of the Sutton tombolo, both have their seaward sides at right-angles to directions of maximum fetch of storm-waves. The former, however, is much more exposed As a result it is proving more permanent than Cush Point, part of

which is at present washing away. The Sutton tombolo (Figs. 1 and 2), linking Howth to the mainland, is due partly to storm-waves entering the Portrane-Howth embayment from the north and north-east, and partly to south-easterly storm-waves.

Dublin Bay was formerly less symmetrical than it is now, and at its western end a smaller bay opened into the larger one (Fig. 3). The inner bay was fronted on the north by the Furlong sandspit, traces of which remained stretching for about 700 yards south from the Clontarf shore at the time when the first Ordnance Survey map of Dublin was made. This spit was evidently built by storm-waves from the east. The outline of the former Clontarf Island, now

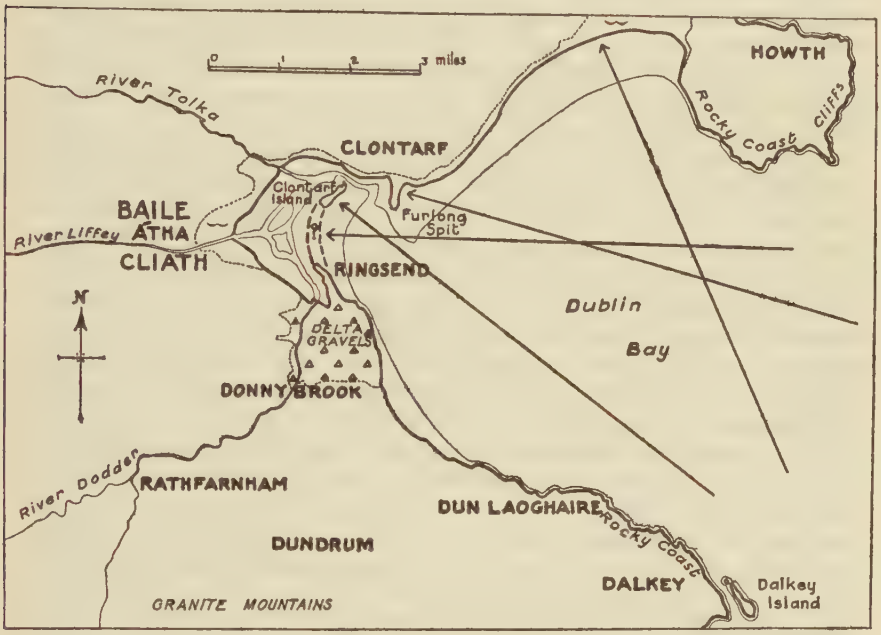

Fig. 3. Hypothetical reconstruction of Dublin Bay in early times.

completely denuded, is also suggestive, since it lay approximately at right-angles to storm-waves advancing from the south-east, in which direction, before Dun Laoghaire harbour was built, there was a clear line of fetch. A considerable remnant of Clontarf Island survived until after the building of that harbour and of the North and South Bull walls, but it has since disappeared under the action of river erosion and tidal scour. The Drift Edition of Sheet 102 (Dublin) of the Irish Geological Survey shows, however, that its site continues the curve of the Ringsend gravel bank,[3] which rises to as much as 22·3 feet above O.D., and it looks as if in early times both may have been united as one narrow spit (Fig. 3), probably rather like that at Rosslare. This supposed Ringsend-Clontarf Island spit may have been so outgrown by the Furlong spit that

part of it was cut off from constructive waves. Another factor in its severing may have been the increased volume of water in the Dublin lagoon on account of a change-over of the river Dodder from a more easterly outlet to its present course. If the spit were once as postulated, it helps to explain the choice of site for Clontarf Castle, guarding the narrow entrance to the Liffey.

The Bulls, which acted to cut off Clontarf Island from the constructive waves on which it was dependent for its existence, now catch and divert the fronts of storm-waves to north and south of the Tolka, Liffey and Dodder mouths (Fig. 2). The North and South Bull sandspits are thus being built at right-angles to the attack of south-easterly storms. Both are almost equally recent, having been formed within little more than the last hundred years. That the North Bull so greatly exceeds the South in size may be partly attributed to the Harbour walls at Dun Laoghaire, which intercept the left flank of storm-waves.

The Wicklow sandspit, which has a length of over 2½ miles and a height reaching 18 feet, is well known because the railway traverses it. It has obviously been thrown up by maximum waves, its curvature at its southern end to a south-south-easterly orientation being due to the Black Castle—Wicklow Head promontory which projects in such a way as to swing round the wave-fronts. The Arklow and Courtown (Plate 1) sandspits are very similar and present no difficulties. The influence of tides, which flow very fast on the Wicklow-Wexford coast before reaching the head of tides between County Down and Lancashire, may be remembered for its possible effectiveness in stream-lining off-shore banks and transporting material, as emphasised by G. H. Kinahan,[4] who unfortunately belittled the action both of storm and of smaller waves. But whatever tides may do in building and shaping submarine banks, it seems impossible to assign any direct function in connection with the modern sandspits. Even in the case of some of the Wicklow-Wexford offshore banks it might be interesting to speculate whether they represent sand and gravel bars formed during post-glacial emergence. On this part of the coast we see that cliffy headlands and sandspits are more reduced to a single line than on the County Dublin sea-front. Changes here will, therefore, be less spectacular than on the other.

From Wexford Harbour a syncline of Carboniferous rocks strikes south-west to the coast between Kilmore Quay and Fethard (Fig. 4). In the embayment corresponding with this syncline of limestones and friable red sandstone the river Slaney has its estuary. On its sides there are traces of several ancient spits ; but only the outer two, the North or Raven spit, and the South or Rosslare spit, will be discussed. At first sight they present some difficulty from the point of view of Lewis's hypothesis. The tip of the North spit now lies at a considerable distance east of the wasting end of the South spit. In Fig. 4, adapted from the Geological Maps (Sheets 158, 159,

169, 170, 180, 181) published about eighty years ago, the North spit is 2½ miles long and the curve out to sea at its southern end is marked. It contains more material than the South spit—one notes its greater width—but its highest top of 48 feet compares closely with that of 46 feet formerly attained in its southern neighbour. The bulk of the North spit probably indicates a large access of material by drifting from the coast farther north. This coast is naturally protected from south-west winds, so that north-east winds (second most important component in cyclones tending to elongation in a north-east—south-west oval form [5]) are here very effective. To some extent this can be seen from the rapidity with which sand heaped into coves by south-easterly wind-waves is eroded by a subsequent north-easter (Plate 2). While invoking beach-drift from the north, however, one must also take account of a possible northerly diversion of part of the river-borne debris of the Slaney by south-west winds coming across the low ground between Ballyteige Bay and Wexford Harbour.

The South spit, at its longest as shown in the One-inch Geological Map (Sheet 170) and by G. H. Kinahan,[6] had an extent of 3½ miles, forming the northerly continuation of a beach 2½ miles long stretching to Rosslare Harbour. This condition is shown in Fig. 4, where the bay formed by spit and beach is beautifully crescentiform, except for the slight convexity to eastwards at the extreme northern end where the " Dogger Bank " formerly accumulated. Neglecting this, we find that perpendiculars bear E. 20° S. at the northern, and E. 20° N. at the southern, ends. If the spit is parallel to the front of storm-waves, the retardation of these towards the south by Greenore Point is readily understandable. What retarded the northern flanks? No barrier is shown on the latest Bartholomew's Quarter-inch Map, but in older maps we find the Lucifer Shoals lying six miles due east of the harbour entrance. Were these and the former " Dogger Bank " the cause of the orientation of the beaches bounding the hollow delta of the Slaney? As they wasted, partly owing to the reduction of the low-tide outflow following the intake of the north and south mudlands in Wexford Harbour,[7] the northern extremity of the South spit evidently became exposed to erosion. To what degree does the extension of the North spit cut off the South spit from constructive waves? What effect have the piers built at Rosslare had in intercepting beach-drift? The writer does not at present pretend to answer these questions. Certainly the new pier built at Rosslare in 1910 acts as a groyne and much sand is banked up against it, but wastage of the South spit had begun before that date.

From the Wexford Harbour spits one turns to those on the south coast of the County. Of these, Ballyteige Burrows (Fig. 4) is easily the most impressive, in some ways, though not in the coarseness of its materials, rivalling the better-known Chesil Beach. Mr. A. Farrington points out to me that, judging from Petty's map

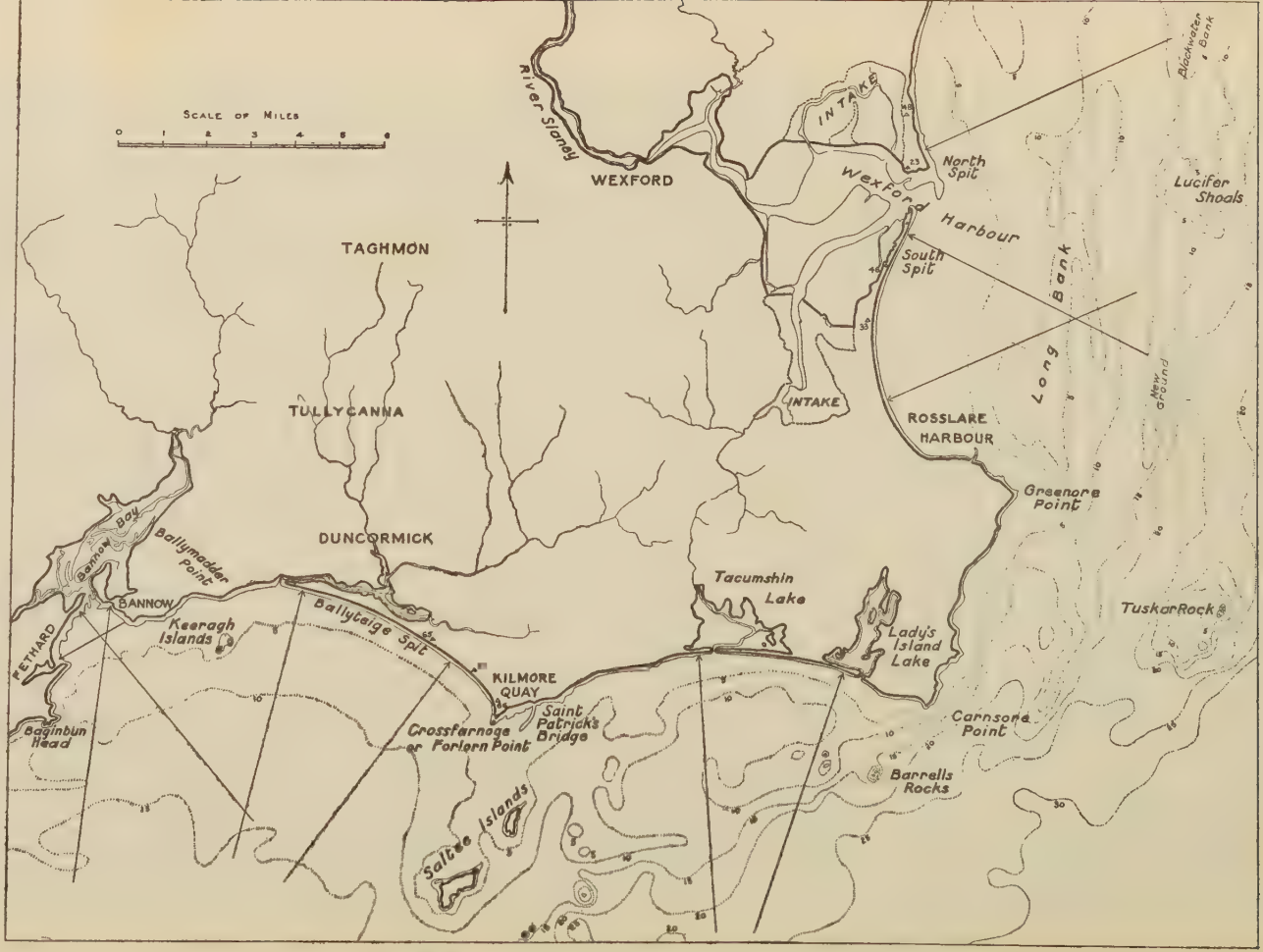

FIG. 4. Sandspits of the Slaney Mouth and South County Wexford.

published in 1655 and regarded as very accurate, it is older than those spits which enclose the lagoons of Tacumshin and Lady's Island. These are not shown by Petty, but at present reach heights of 39 and 42 feet respectively. They are not nearly so high as the Ballyteige spit which has summit-levels of as much as 66, 57, and 65 feet at different points along its length. Their smaller height is probably due to the fact that between Carnsore Point and the Saltees there are numerous banks and half-tide rocks calculated in part to abate the force of storm-waves. The vast amount of boulder clay undergoing erosion on the rocks and islands of this coast may also for a long time have helped to protect it from constructive storm-waves.

In the case of Ballyteige Burrows the approach of south-south-westerly waves is uninterrupted in the wide bay between the Saltees and the Keeragh Islands. Here also the direction of maximum fetch of storm-waves and that of the prevailing wind are the same. The resulting spit, almost 6 miles long and only slightly crescentiform, shelters the low ground between Kilmore Quay and Duncormick. It would probably extend at least half a mile farther west but for the action of the Keeragh Islands in intercepting storm-waves, for significantly enough these isles lie almost due south-west of its present termination. In any case it could not grow more than about half a mile, since farther extension would be prevented by a change in the direction of the coast, which, as one goes towards Ballymadder Point, is exposed to erosion by the oblique onset of the south-west waves.

Two and a half miles north-west of Crossfarnoge (or Forlorn Point) there are hollows in the Ballyteige spit twenty feet deep, scooped out by wind and cut down either to a layer of pebbly beach material or close to the water-table, where mosses [8] and other plants flourish. In one of these aeolian hollows, situated due west of the large farm of Ballyteige Flat, limestone pebbles may be found on which the exposed upper surfaces are covered by devious furrows about a millimetre deep that are due to sand-blast. Pebbles harder than limestone are usually unaffected. On the spit at this point, and to westward of it, it is interesting to find flat pieces of red sandstone reaching dimensions of about 1 foot by 1½ feet by 1½ inches, dislodged from an undersea outcrop and cast ashore during storms. The thirty-foot line lies half a mile off-shore, the sixty-foot line about 2 miles beyond that (Fig. 4). One can picture, therefore, the predominantly oscillatory waves of the open ocean breaking as the sea-floor becomes shallow and dislodging pieces of the sea-bottom which may afterwards be transported bodily.

In County Waterford (Fig. 5) the Tramore spit crosses the shallows of Tramore Bay in a general east-south-east direction, modified to east-west at the Tramore end, and to east-west and then north-east as it approaches Slate Point, where the drainage of the Keiloge and other rivers escapes to the sea through a narrow channel.

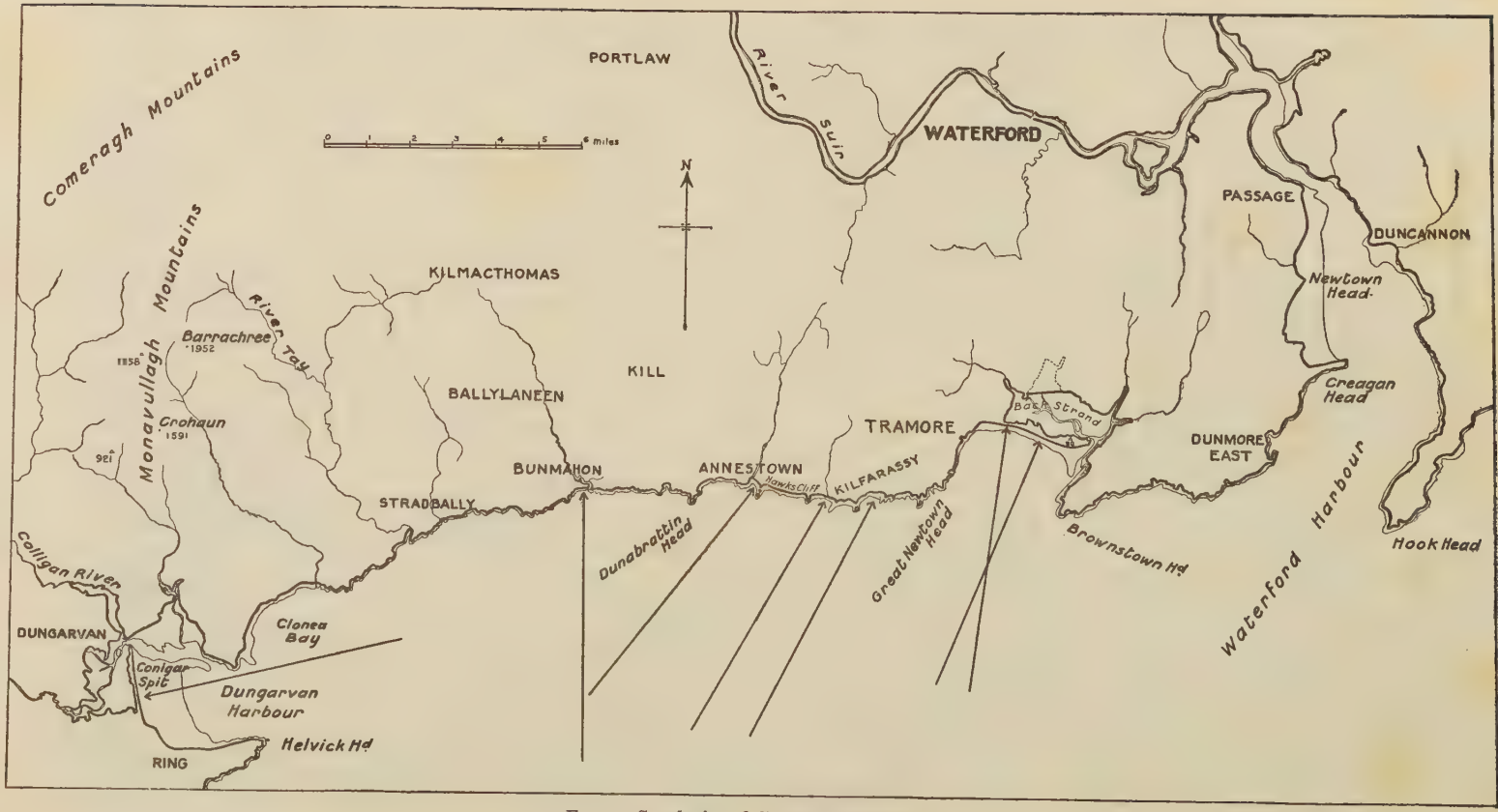

FIG. 5. Sandspits of County Waterford.

The greater part of the spit is not high, only reaching about 19 feet, but at its eastern end a prominent cluster of sand-hills attains the height of 98 feet. The amount of sediment available for spit-building is greater where the rivers and ponded waters of the Back Strand flow out, and there is also beach-drifting in that direction produced by small waves due to the prevailing south-south-west and south-westerly winds. The great height of the sand-hills suggests the immense strength and size of the maximum waves here. The high cliffs on the west-north-west and east-south-east sides of Tramore Bay also bear witness to the work of prevalent waves and storm-waves, both of which strike obliquely on the sides of the Bay and steadily drive landwards the debris they abrade.

Between Tramore and Stradbally the Ordovician lavas, tuffs, and shales of County Waterford are truncated by an impressive series of cliffs on an east-west trending coast. The strike of the isoclinally folded beds is north-east—south-west, so that as might be expected the differential erosion of igneous rocks and shales has produced ridges with that trend. The primitive drainage was, however, from north to south, and has given rise to marked valleys in that direction. In minor valleys a filling of boulder clay may be exposed where the sea has abraded the valley mouths, but the ends of deeper north-south valleys, like those at Annestown and Bunmahon, are drowned by the sea. Everywhere in coves corresponding with valley ends, sand accumulates in the form of beaches lying at right-angles to the longest fetch, while at Bunmahon there is a short east-west sandspit.

The remarkable and rather puzzling Conigar spit (Fig. 5) at Dungarvan remains to be discussed. It is $1\frac{3}{4}$ miles long, quite straight, lying at the back of a long bay. As an objection to W. V. Lewis's hypothesis it has been pointed out to me that the perpendicular from the middle of the spit does not bear out to open sea but hits the north side of the bay. A similar objection applies to Lewis's interpretation of the Calshot spit. On a strict reading of his paper [2] one would expect the latter to lie at right-angles to the Spithead-Southampton Water channel, but it is actually about 15° off its theoretical direction.[9] From the One-inch Geological Map (Sheet 178) we see that the Conigar spit lies parallel to, and at a distance of 1 mile from, low-water line. This probably means that at the time of the formation of the spit, just as when the original Ordnance map was made, the gradient of beach and bottom in Dungarvan Harbour, so far as it was built of unconsolidated sediment, sloped east-north-east. The slope of the slob is likely to be due to the same causes that control the orientation of the spit. To explain both we must go a step farther, and one suggestion is that approach to the steep easterly face of the Comeragh and Monavullagh Mountains, which rise to 2597 feet and together run for 16 miles practically due north of Dungarvan Harbour, tends to deflect easterly winds to an east-north-east direction. For confirmation

one would require a long series of wind observation in the Dungarvan district such as is not available. Unfortunately also, at the nearest station—Roche's Point—on the east side of the entrance to Cork Harbour, thirty miles away, the wind records [5] are affected by the fact that land rising to 281 feet acts as a partial shelter from north-east and easterly storms.

The Conigar spit is now washing away. Mr. A. Farrington reports that the building of a pier at Helvick Harbour is intercepting a certain amount of beach-drift. But why do not storm-waves build up the spit from the slob ? After the breaking of oscillatory waves in the shallows, waves of translation must carry a certain amount of sand towards it ; but perhaps they spend themselves in crossing the slob, which has probably grown since the original construction of the spit. There is also the likelihood that storms of sufficient violence to build such a spit are rare. At any rate, after an existence of over three hundred years, the Conigar sandspit may be looked upon as in the last stage of its history. In the whole or in part it may be levelled with the rest of the slob, which will continue prograding seawards until, perhaps some hundreds of years hence, easterly storms will produce another spit, parallel to the old one but situated farther east.

II. Shore Pot-Holes

Where the material carried up and down a beach grinds upon solid rock, the latter is usually abraded quite smooth. This effect is found where wave-action is strong—where, for instance, the waves have a long fetch from the open sea. Such abrasion is well seen along the cliffs of most of the Irish coast. By way of contrast, where the abrading material is handled less violently, its movement tends to etch along existing planes of weakness, and irregular furrows are produced. The Ordovician limestone at Portrane, County Dublin, shows these ; and in places pot-holes occur at a level a few feet below high-water mark. They are most noteworthy in a cove 500 yards south-west of the North Martello Tower, where the direct access of waves is prevented in almost all directions.

Pot-holes are not very common on beaches. Erosion, as we have seen, is there generally too strong. But others as well as those at Portrane have been recorded by J. Challinor,[10] at Craig y Delyn, North Cardiganshire, and also on part of the Californian coast by A. C. Swinnerton,[11] who first treated them as characteristic where waves are not powerful enough to hold their abrading tools firmly.

NOTES AND REFERENCES

In submitting this sketch of some shore-features in the south-east of Eire, I wish to point out that I have not personally visited the Conigar spit. For information and discussion of the difficulties concerning it and those at Wexford Harbour I am deeply indebted to Mr. A. Farrington. Thanks are also due to Mr. W. H. Laurie, who put the lettering on the maps.

[1] Johnson, D. W., *Shore Processes and Shoreline Development*, Chapman and Hall, London, 1919, pp. 330-331.

PLATE 1. Sandspit-protected harbour, Courtown, County Wexford.

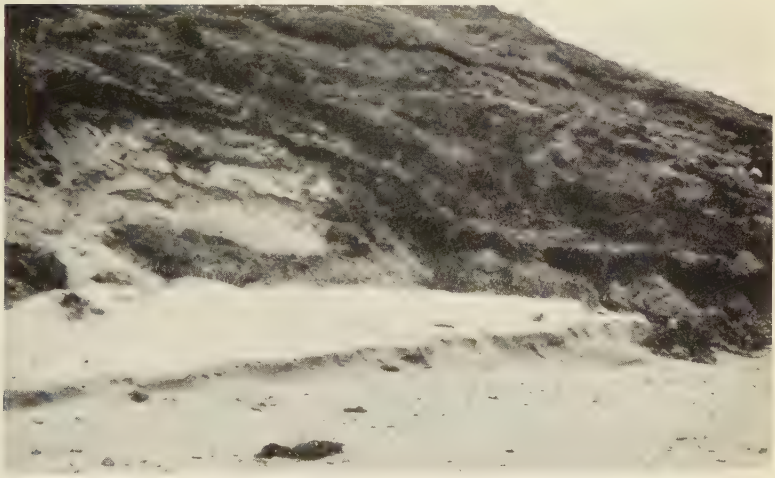

PLATE 2. Sand step, or nip, in front of sand hills at north end of Pollshone Harbour, County Wexford. A deposit built up by south-easterly waves has been partially eroded by waves from the north-east.

PLATE 1. The isthmus joining Gibraltar to the mainland. The hill in the distance is part of the Siena Carbonera, known locally as the Queen of Spain's Chair.

PLATE 2. The Rock of Gibraltar, north face.

[2] Lewis, W. V., "The Evolution of Shoreline Curves," *Proc. Geol. Assoc.*, vol. xlix, 1938, pp. 107-127.

[3] McHenry, A., "The Geology of the Country around Dublin (Explanation of Sheet 112)," *Mem. Geol. Survey of Ireland*, 1903, p. 91.

[4] Kinahan, G. H., "On Chesil Beach, Dorsetshire, and Cahore Shingle Beach, County Wexford," *Quart. Journ. Geol. Soc.*, vol. xxxiii, 1877, pp. 29-41, Pl. II.

[5] *The Weather of the British Coasts*, pp. i-viii, 1-158, numerous figures and especially Pl. XXII. M.O. 230, H.M. Stationery Office for the Meteorological Office, London, 1918.

[6] Kinahan, G. H., *loc. cit.*, Pl. II.

[7] Kinahan, G. H., "Explanatory Memoir to accompany Sheets 169, 170, 180, and 181 of the Map of the Geological Survey of Ireland in County Wexford," *Mem. Geol. Survey of Ireland*, 1879, pp. 18-19.

[8] Doyle, J., "Some Common Sand-Dune Mosses of the East Coast of Ireland," *Irish Nat. Journ.*, vol. vi, 1936, pp. 52-53.

[9] Lewis, W. V., *loc. cit.*, Fig. 16.

[10] Challinor, J., "Some Coastal Features of North Cardiganshire," *Geol. Mag.*, vol. lxviii, 1931, pp. 111-121, Pl. VII.

[11] Swinnerton, A. C., "Observations on Some Details of Wave-Erosion: Wave Furrows and Shore Potholes," *Journ. Geol.*, vol. 35, 1927, pp. 171-179.

GIBRALTAR *

By P. W. C. Dennis

In view of the fact that Gibraltar has neither agricultural nor mineral resources of value to the outside world, it is not surprising that, before the Italian invasion of Abyssinia in 1935 directed attention towards the Mediterranean, the colony was generally considered to be of comparatively insignificant value to the British Empire. The growth of Italian sea-power, and the possibility of a Nationalist Spain aligning her policy with that of the Axis Powers, however, have brought into prominence once more the strategic aspects of the importance of Gibraltar.

The Crown Colony stands at the eastern end of the Straits of Gibraltar and consists of a narrow promontory running southwards from the

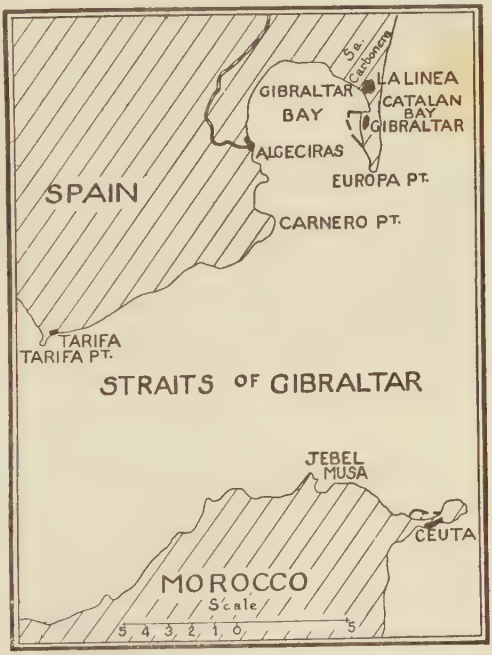

Fig. 1. Scale in miles.

* This article was set in type before September 1939, and at the instance of the author was withheld until official permission to publish had been received. It is now printed in its original form.

Spanish coast. It is composed of a large limestone mountain known as The Rock of Gibraltar, together with part of the sandy isthmus which connects this mountain to the Spanish mainland. The Rock itself is about two and a half miles in length and three-quarters of a mile in width, and rises to a height of about 1400 feet. Originally the sandy isthmus, which is about one mile in length, was neutral ground, but by agreement with Spain during the Great War the territory was divided between the two countries and the British lines now stand in the middle of the isthmus. With this territory the total area of the colony is about $1\frac{7}{8}$ square miles.

The feature to which Gibraltar owes most of its strategic strength is the rugged nature of the limestone of The Rock. In the north, a precipitous cliff rising to a height of over 1300 feet constitutes a strong natural bulwark against any attack across the isthmus. The eastern side of The Rock likewise has the protection of steep slopes, and the sea cliffs around Europa Point at the southern end of The Rock render attack from this direction almost impossible. The only area in which a landing from the sea has ever been possible in the past is that behind the present site of the Naval harbour on the western side of The Rock. Here shales and red sands lie over the limestone and slope fairly gently down to the sea. It is in this region that the town is built, and here most of the early British fortifications are to be found. The building of the Naval harbour has now, however, made it impossible to gain access to this region without first entering the harbour ; consequently these fortifications are no longer required.

On approaching Gibraltar by sea from the west the town appears as a close conglomeration of houses at the foot of The Rock. Apart from olive trees and other Mediterranean evergreens on the upper slopes, the promontory is lacking in vegetative cover, and it is usually with great surprise that the traveller learns that this barren limestone mountain supports a population of 17,500 persons. The reason for the existence of this large population can more easily be found in the history of the colony than in its present resources.

History of the Colony

Apart from mention made by classical writers, little can be ascertained regarding the history of Gibraltar before 711 A.D., in which year a Moorish commander named Tarik took possession of the fortress. The present name is almost certainly a corruption of Gebel Tarik, which means Tarik's mountain. The motive of the Moors in capturing and occupying Gibraltar was to obtain a foothold on the Iberian peninsula and a jumping-off place for further conquest. Apart from the period between 1309 and 1333 the Moors held The Rock continuously until 1462, when a successful surprise attack was made by the Spaniards under Alonso de Arcos.

The Rock was then held by Spain until 1704, when Sir George

Rooke, assisted by Prince Henry of Hesse-Darmstadt, captured it for Britain during the War of the Spanish Succession. In the course of the eighteenth century, Gibraltar withstood three sieges by the Spaniards, the last of which was the famous siege of 1779-83, during which The Rock was ably defended by Sir George Eliott. In addition to trying to recapture Gibraltar, Spain has offered possessions such as Minorca and Costa Rica in exchange for it. Such an exchange, however, has always been refused on the grounds that public opinion in Britain was too strongly opposed to surrendering Gibraltar, although British statesmen such as Pitt the Elder did not regard The Rock as of great value.

The strategic value of The Rock to Britain first became apparent when Nelson's fleet put into the Bay of Gibraltar after the battle of Trafalgar in 1805. About the same time great commercial development was taking place largely as a result of the exclusion of British shipping from other European ports under the Continental system inaugurated by Napoleon.

The trade built up during the Napoleonic wars continued some years after the peace treaty of 1815, and Gibraltar became of special importance as an *entrepôt* port for trade between Britain and Barbary. In 1824 the cotton and woollen goods imported from Britain were valued at £1,125,000. Between 1791 and 1824 the population rose from 3000 to 17,000, most of the immigrants coming from Genoa, Malta and Spain. The increasing use of steamships, which carried their cargoes direct to their destinations, however, resulted in a decline in prosperity ; by 1850 the population had fallen to about 15,000.

The opening of the Suez Canal in 1869 increased again the strategic and commercial importance of Gibraltar, and soon after this date work was begun on the establishment of a Naval harbour. At the same time the port developed as a coaling station for cargo vessels travelling to the Far East, and by 1901 the population had risen to over 20,000. Since this date, however, there has been a steady decline, partly owing to measures taken to restrict the right of residence to British subjects born in the colony, and partly owing to emigration which has taken place across the Spanish frontier to La Linea, where rents are much lower.

Present Population

Most of the civilian population of Gibraltar are of Spanish, Genoese or Maltese descent. The fact that it is of mixed descent does not prevent the population from being loyal to Britain, and there is no desire amongst any section to be politically united with Spain or any other power. The sympathies of these people during the Spanish Civil War were mostly with the Republicans, but there was not sufficient feeling in favour of this cause for many of them to go and fight in Spain. In outlook they resemble an insular

population, as their interest does not extend far beyond the colony itself.

The living space on The Rock is extremely small, and most of the population of 17,500 live in the town area on the western side of The Rock, which covers about ninety acres. On the eastern side, the village of Catalan Bay, which has a population of Genoese descent numbering about 300, is the only settlement. The village, however, is of considerable interest. Originally the inhabitants were dependent upon fishing for their livelihood, but now most of the men work in other parts of Gibraltar and fish only in their spare time. The isolation of the village has been somewhat reduced recently by the building of a road at the foot of the eastern slopes of The Rock. There is, however, still practically no emigration to other parts of Gibraltar, owing to the strong social ties of this community. The men from the village are generally more industrious than workmen from other parts of Gibraltar, and the women augment the earnings of the menfolk by doing laundry work. The boats drawn up on the beach and the washing hung out on lines around the village give it the appearance of being a village of fishermen and washerwomen, but in actual fact the inhabitants are dependent upon wages earned in other parts of the Colony for the major portion of their living, although socially they remain aloof.

Overcrowding and Labour Conditions

Probably the most serious problem which confronts the civilian population of Gibraltar to-day is that of overcrowding. The houses in the town area are closely packed together and rise one above the other in rows on the western slopes of The Rock. The accommodation provided by this cluster of houses is not sufficient for the population, and consequently the normal dwelling of a working-class family, which is usually six or seven in number, consists of only one or two rooms in a tenement building. When the degree of overcrowding was investigated in 1938, it was found that, by the standard adopted in Great Britain, over 50 per cent. of the working-class families were living in overcrowded conditions.

This degree of overcrowding, which is almost as bad as can be found anywhere in Europe, is due partly to the lack of land suitable for building on The Rock and partly to the policy of the Military Authorities by whom the building of civilian houses is restricted. This policy was designed to prevent immigration into Gibraltar, since from the military point of view a large civilian population, dependent upon the commerce of the port, is undesirable ; in time of siege, a large amount of food and water would be consumed by civilians who were not contributing to the defence of the fortress. The policy has probably been partly successful in limiting immigration, but the lack of accommodation in Gibraltar has resulted in

PLATE 3. Close conglomeration of houses behind Casemates Barracks.

PLATE 4. Catalan Bay on washing day.

PLATE 5. An Indian awaiting unwary tourists outside his shop.

PLATE 6. Collecting water at a supply station.

PLATE 7. A water vendor.

PLATE 8. Awaiting a customer at Catalan Bay.

many of the Dockyard employees living across the frontier in La Linea. Consequently the closing of the frontier for even a short time would result in considerable disorganisation of the Dockyard.

Another undesirable feature arising from the lack of accommodation is that rents have become excessively high. On an average the local labourer, whose minimum wage is only 26s. per week, pays a rental of 10s. per week for his scanty accommodation. He has thus to contend not only with inadequate accommodation, but also with a lack of money to spend on food and other essentials. Employers often complain, not without justification, that the labourer is inefficient and indolent, but given the opportunity of a better standard of living the men would probably increase their efficiency. Although there is a lack of skilled labour in the Colony, more attractive wages for skilled workers would simply induce more of them to qualify as tradesmen.

Recently a beginning has been made with the work of providing more accommodation for the working classes, and at the same time the men are being encouraged to learn trades instead of being content with unskilled work, or swelling the ranks of the " black-coated " workers. A Rent Restriction Act has recently been passed, and official action taken to prevent sub-letting of Government leaseholds. The need for the latter was most apparent from the state of affairs existing until recently in Catalan Bay, where some twenty-three houses leased by the Government at a gross rental of £33 per annum were sub-let by the lessees for a total rental amounting to no less than £670 per annum.

For the present it is obvious that strategic considerations are of more importance than the provision of better conditions for the civilian population, but it is to be hoped that as little time as possible will be lost in improving the lot of the worker in return for his loyalty. Doubtless such an improvement would eventually react favourably on the general efficiency of the fortress, as both the Army and the Navy are to a great degree reliant upon civilian labour.

Water Supply

Besides the difficulty of finding suitable sites for building on The Rock, settlers have always had to contend with problems connected with their water supply. During the Moorish occupation wells were sunk in the sands which lie below the town. These were used until the British took the fortress in 1704, when they were sealed up on account of their insanitary condition. From that time until the rainwater catchments were constructed at the beginning of the present century the population relied upon roof collection for their supply of fresh water. The most important catchments are those on the eastern side of The Rock. These have been constructed by first driving wooden supports into the sandy slopes on this side, and then covering these with sheets of

galvanised iron, which are in turn given a dressing consisting of a thin layer of cement. Rain falling on the catchments runs off into an artificial stone channel at the base, and from this the water is diverted into a tunnel cut right through The Rock from east to west. Inside the tunnel and at right angles to it nine large reservoirs each with a capacity of over 1,000,000 gallons have been excavated.

At present the total storage capacity is about 12½ million gallons, whilst the volume of water which can be collected in a year of average rainfall (about 35 inches) is approximately 21,000,000 gallons. Unfortunately the rainfall is subject to fairly wide variations, so the amount of water collected on the catchments varies considerably from year to year. The maximum annual fall ever recorded is 77 inches, whilst the minimum is only 15 inches. As there is practically no rainfall between the end of May and the middle of September there is danger of a water shortage at the end of the summer in a year of low rainfall.

Recently the supply of water from the catchments has been augmented by the sinking of two fresh-water wells near the British boundary on the isthmus. Before fresh water was discovered and wells were sunk in 1935, only brackish water had been found in the sands of the isthmus. As nothing is known of the strata beneath the sands of the Spanish part of the isthmus it is not possible to form any satisfactory conclusion regarding the origin of the fresh water. The most probable theory is that the water is derived from the Siena Carbonera, the neighbouring Spanish hills.

Ever since the discovery of these wells the total fresh water supplied to the population has not generally exceeded 20 million gallons. In 1937, 17 million gallons were supplied to the population, and a further 8 million gallons were supplied to ships. Most of the water used for all purposes other than drinking is brackish. This is all obtained from wells on the isthmus, and the consumption in 1937 amounted to about 250 million gallons. Considering the large number of purposes for which brackish water is used, an increase in the fresh-water supply is highly desirable. For the last few years the work of excavating new reservoirs has been carried on almost continuously, in order to increase the storage capacity, but another need, which will require attention in the near future, is for a piped connection to every house. All houses have brackish water laid on, but many are dependent for their supply of fresh water upon vendors and City Council supply stations. It is a common sight to see men leading donkeys laden with barrels of water around the streets, and women collecting water in buckets from the supply stations. Whereas in the past roof collection was the main source of supply, this method is now discouraged in view of the fact that the Gibraltarian often uses his flat roof as a garden, a chicken run, or a laundry, for which he is unable to find space elsewhere.

Regarding the water supply of Gibraltar in war time, it may safely be said that the reservoirs excavated in the interior of The Rock are invulnerable, but the catchments might be severely damaged by air bombardment. Thus Gibraltar might be deprived of her most valuable source of supply, but with strict economy the colony could probably subsist for a year on the water stored in the reservoirs, provided these were not unduly low at the beginning of the year.

Commercial Development

In view of the fact that strategic considerations are of most importance at Gibraltar, it is often not realised that the colony has a considerable degree of commercial development. The Bay of Gibraltar is the best natural harbour on either side of the Straits, but, through being politically detached from Spain, Gibraltar has been prevented from developing as an outlet for the produce of its natural hinterland. The port has, however, considerable *entrepôt* trade in bunker coal and fuel oil. British ships travelling between the United Kingdom and Mediterranean countries, or the Far East, often re-fuel in the bay. For these ships Gibraltar is often the first port of call on the outward journey and the last on the homeward journey. Besides British ships a considerable number of Dutch, Norwegian and Italian ships use the port to replenish their supplies of coal and oil. Since 1933 the total tonnage entered at the port has exceeded 10,000,000 tons, whilst in 1937 the figure reached 13,728,709 tons.

The ships supplied with coal and oil at Gibraltar are mostly cargo vessels, but there are also a large number of liners which call regularly at the port. The British passenger services calling regularly are the Orient, the P. & O. and the Bibby lines, whilst amongst foreign lines are the Rotterdam Lloyd, the Japanese N.Y.K. and the Italian Trans-Atlantic lines. Tourists going ashore in tenders provide the colony with much trade. Between January and September 1932 a census revealed that 89,000 tourists came ashore.

The shops which benefit most from trade with tourists are the Indian shops, which sell a variety of articles, including ornaments from India, silk from Japan, scents from France and leather goods from Morocco. In Main Street there are twenty-eight Indian shops of varying sizes which are almost entirely dependent upon tourists for their trade. The shops are mostly run by Indian firms, but often there is only one Indian representative on the staff, who stands at the door when a liner is in port to give the store its Oriental tone.

Besides tourists coming ashore from liners there are visitors who spend the winter at Gibraltar, being attracted by the mild and sunny climate. The only unpleasant feature of the climate is the Levanter wind, which, blowing from the east across the warm

waters of the Mediterranean, brings humid conditions. This wind is of most frequent occurrence in summer and its dampness is usually sufficient to cause a banner of cloud to hang around the top of The Rock. In winter, however, cooler winds from the west are most often experienced. These are usually accompanied by sunny conditions, but at times heavy downpours of rain occur. The alternation of rain and sunshine is ideal for the numerous species of wild flowers which cover the Upper Rock, and for the cultivated Alameda Gardens; these features render Gibraltar attractive to visitors who have left the British Isles in winter. Amongst the wild plants which flower in winter and spring the bulbous ones, such as the Narcissus, the Iris and the Asphodel, are possibly the most beautiful, whilst Mimosa, Bougainvillea, Wistaria and Plumbago are a few of the most attractive cultivated species.

Although Gibraltar is completely reliant upon the outside world for its food supplies, the well-developed port and the land connection with the agricultural provinces of Malaga and Cadiz in Spain render the import of food supplies a fairly simple matter. Meat, flour, sugar and tinned foods are mostly imported from the United Kingdom, or the United States, whilst fresh fruits and vegetables are obtained from Spain. Much of the produce from Spain is brought in by the Spanish peasants who have grown it. Every morning donkeys and carts come into the colony loaded with a great variety of vegetables, including pumpkins, egg plants and green and red pimentos, whilst the fruits brought in include melons, grapes, figs, peaches and oranges.

Before the Nationalist Government came into power in Spain these street vendors, workmen and others who come into Gibraltar daily, used to carry on a little smuggling on their return journey each evening. Black-shawled women would congregate in the Victoria gardens, which stand near the frontier, to hide away groceries amongst their shawls, whilst their men-folk hid small quantities of tobacco and sugar in their boots. The number of grocery and tobacco shops in Gibraltar is out of all proportion to the needs of the population and they are suffering now from the suppression of smuggling by the Nationalist authorities in Spain. Search at the frontier has become most scrutinising and a smuggler stands the chance of being forced to drink a considerable quantity of castor oil if he is discovered with contraband.

The Strategic Value of Gibraltar To-day

The most important strategic function of Gibraltar is as a base from which the Navy can protect British shipping in the Western Mediterranean and adjacent parts of the Atlantic. In the Great War the port was used as a convoy collecting centre for ships from the Mediterranean and from South Africa, and for this purpose it

could be of great value in any future war. The naval harbour is large enough to contain the whole Mediterranean fleet, and when the new dry dock is completed, docking accommodation will be available for the largest battle cruisers afloat.

The main function of the garrison at Gibraltar is to defend the naval base against any attempt to capture or bombard it. Modern developments in artillery have probably rendered The Rock even more difficult to capture than it was in the past, but against this there must be set the fact that long-range guns, operating from Mount Musa on the Moroccan coast, from the heights behind Algeciras or from the Siena Carbonera north of Gibraltar, could probably render the harbour untenable as a naval base. Aircraft, too, operating from Spanish bases such as Malaga or Moroccan bases such as Ceuta or Tetuan, could also prove a great menace.

It is therefore of vital importance for the efficient functioning of the naval base that Spain should not be an enemy power and that Moroccan territory should not be in enemy hands. The development of air attack has rendered Gibraltar less secure than it was in the past, but provided the fortress is not subjected to such attack from a base too near at hand the danger is not great. Unfortunately the colony is lacking in space for the establishment of an aerodrome and possesses only a small landing ground on the isthmus between The Rock and the Spanish mainland. The galleries which were excavated for the accommodation of cannon during the siege of 1779-1783 could, however, provide excellent shelter for the civilian population. In addition to these a number of smaller shelters are being dug out of The Rock nearer the town, so that the whole civilian population can be accommodated in bomb-proof shelters.

With a neutral Spain, the possession of Gibraltar would be of great value to Britain in any war in the Mediterranean, as the naval base could be used for the protection of British ships and for preventing enemy ships from using the Straits. In the event of Britain being faced with a hostile Spain, however, she would have to concentrate her effort on defending The Rock against capture, or starvation through siege, and with a civilian population of 17,500 this task would indeed be a formidable one.

How much Nationalist Spain desires to obtain the return of Gibraltar to Spain is a matter of doubt. The Rock has now been a British possession for two hundred and thirty-five years, which is nearly as long as the period it was held by Spain, but the words of Señor Florida Banca spoken in 1783 probably represent the views of the less moderate Spanish Nationalists to-day. He said, "I consider Gibraltar as a possession, though overrated as to its solid importance and value, is a perpetual thorn in the side of Spain and a great obstacle to the establishment of complete cordiality." Consequently, sentiment may cause the return of Gibraltar to Spain to be demanded, but if reason prevails it is unlikely that such a demand will be made.

It is obvious, however, that Gibraltar is of great strategic value to Great Britain, as a vital link on the arterial waterway through the Mediterranean to India and the Far East. Furthermore, the unquestionable loyalty of the population, together with the alignment of the commerce of Gibraltar with that of the British Empire, are irrefutable reasons for the colony remaining a British possession.

For the future, it is hoped that international conditions will become more stable, and strategic interests consequently of less importance, so that many further improvements may be effected in the social conditions of the population, particularly as regards Health and Housing Services.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

Meetings of Council, October 3rd and 24th, 1939

Presentations to the Library.—The following donors were thanked : Mr. William Wilson for geographical models and maps specially designed for educational purposes ; Mr. J. Mathieson and Mr. J. Mowat for gifts of topographical books.

Position of Geography in Education.—It was intimated that the Scottish Universities Entrance Board has issued its regulations for the University Preliminary Examinations, and it was noted with satisfaction that Geography is now placed in a much better position. As in the Higher Leaving Certificate, it is linked with History, and every candidate must take one or the other. Whereas, however, in the new Leaving Certificate Geography counts as a full subject, in the case of the Preliminary Examination the subject selected, *i.e.* Geography or History, forms part of the English group ; on the other hand Geography (or History) is now compulsory.

Policy of the Society during the War Period.—Owing to the difficulty of carrying out arrangements for evening Lectures it was agreed that these meetings be cancelled at all Branches and that as usual afternoon meetings be carried on at Edinburgh and if possible at the other Centres.

While it is hoped to continue publication of the *Magazine*, the use of the Library and other activities of the Society, the Council agreed that in view of reduced privileges and the need for individual retrenchment, and also to discourage resignation, the Annual Subscription for the year 1939-40 be reduced as follows : Edinburgh Centre from 30s. and 25s. to 15s. Other Centres from 21s. to 10s. 6d.

Lecture Session, 1939-1940.—The following Afternoon Lectures were delivered in the Society's Rooms, Edinburgh : October 25th : Mr. Charles B. Boog Watson—" The Rhine " ; November 1st : Dr. G. W. Tyrrell—" Mineral and Agricultural Development in the Soviet Union." The Lectures were illustrated.

REVIEWS OF BOOKS

EUROPE

The Face of Edinburgh. By WILLIAM POWER. Drawings by ROBERT EADIE. Glasgow : John Smith and Son Ltd., 1939. *Price* 4*s.* 6*d.*

A kind and discriminating friend has suggested that this modest little book resembles a necklace, or bracelet, composed not indeed of gems, but of very pretty beads strung on a somewhat commonplace string.

And the simile is rather happy. The illustrations are really excellent, reaching the "heart" of Edinburgh behind the "face" and showing the appreciation by a kindly Glasgow artist of what no visitor should fail to see. They are accurate, a great virtue : sympathetic, a more tender quality ; and few better mementoes of a visit to Edinburgh could be found. Instead of the dry cold truth of the photograph, they have the lifelike warmth and colour of deeper truth. But the title page should have been "By Robert Eadie, R.S.W., with notes by William Power"! For the letterpress, the connecting string, almost defies or disarms criticism ; bristling as it is with naïve "guidebook" inaccuracies and quaint personal likes and dislikes, we cannot take it seriously.

A helpful skeleton map forms a suitable tail-piece. C. B. B. W.

Bygone Fife North of the Lomonds. By JAMES WILKIE. Edinburgh : The Moray Press, 1939. *Price* 7*s.* 6*d.*

The death of James Wilkie deprived Fife of a worthy son and an able historian, whose pen caused the dullest of documents to come alive and have meaning. This, his last work, was left in rough draft, and has been published through the agency of his sisters. Its title is perhaps a little misleading, for its scope is not as great as might be indicated : indeed, the core of the book is Falkland, and to a less extent Leslie, while several incidents relate to places like Markinch, which cannot be said to be north of the Lomonds.

One must, however, be grateful for the relics we possess : and Mr. Wilkie's writing is as fluent here as of yore, and his pictures of the countryside and its people. Such misprints as occur, mainly in quotations, are pardonable, and do not detract from the charm of the work. A. M.

The Historical Geography of the Shetland Islands. By A. C. O'DELL, M.Sc. Lerwick : T. and J. Manson, Shetland News Office, 1939. *Price* 12*s.* 6*d.*

The Shetland Islands are here described with a field observer's eye at the present day and through their history, and scholarly reconstruction does not fail in lively human interest. The result is a thoroughly readable book, yet one that for geographical scholarship will bear comparison with any Scottish regional monograph. Although the approach may be new to non-geographical readers they will come to feel that it is sound. After outlining the island environment in Part I, Mr. O'Dell notes the characters and theatres of island activities, rural and urban (giving a note for the tourist), and only in Part III does he conclude with the historical sequence. Through this having been left to the end, we have become familiar with the players—whether natural forces or men—and can read purpose into the narrative of their actions.

Ingenuity has not been lavished in vain upon the maps and diagrams to make a point of comparison or contrast tell, or to summarise a mass of statistics in a single curve. The plotting of wrecks caused by U-boats is a significant little map to-day. For a book so abundantly illustrated the price is low and the get-up is creditable for a local press. Mr. O'Dell was Editor for the Land Utilisation Survey of the islands, and this one-inch map and his book (for which the L.U.S. are the London agents) go admirably together. A. G.

Scotland : Old Strathclyde (*Lanarkshire, Renfrewshire, Dunbartonshire, Ayrshire, Buteshire, Dumfriesshire, Kirkcudbrightshire, and Wigtonshire*). By B. H. Humble. Hutchinson's Pocket Guides, edited by W. S. Shears. London : Hutchinson and Co. (Publishers) Ltd., 1939. *Price* 6*d.*

This is the ninth of this series of guides and the first devoted to Scotland. There are fourteen illustrations from photographs by the author and others, and a folded map (19×16 inches), with main roads in colour, on a scale of six miles to one inch. In this entertaining book of 144 pages he gives a quite comprehensive survey of what was once the ancient Kingdom of Strathclyde, describing the eight counties, including " grey Galloway," containing as they do almost half Scotland's total population of five millions. He remarks that probably in no such comparatively small area have so many men been born who have changed the face of the earth, including engineers and inventors. Equally interesting are the literary references. The many-sided national life of the southern Scottish counties in the course of the thousand years of their history is well sketched, and his descriptions of natural and architectural beauty are good, as are also those of many notable viewpoints. There is an index of rather over two hundred entries. The whole is excellent value. W. M.

ASIA

The Regional Balance of Man. By Radhakamal Mukerjee, M.A., Ph.D. Madras : University of Madras, 1938. *Price* 8*s.*

One of the earliest contacts of the present reviewer with Professor Mukerjee came about through that brilliant economist's eager search into the relationship of his subject with geography and sociology in India in 1923. His life-work might be described as building economics upon geographical foundations while orienting economic means towards higher social ends. Above all he writes as an Indian of India, and here especially of the Ganges Plain. In this work he illuminates " the dismal science " by the discoveries of ecologists, the plant and animal " geographers " of worlds ranging from what to us is " natural " scale down to the microscopic worlds of insects and bacteria. " Go to the ant, to the bee, the coney and the wild herd, thou Economist, thou Sociologist ! " we imagine him saying, " study the communities of plant and animal, the intricate reactions of the grass on the herbivore and of the herbivore on the grass. For thus shalt thou better understand the relationship of the many factors at work upon Man, and of Man upon them." The result is a stimulating and well-informed study of Human Ecology applied to northern India, and an eloquent plea for regional research particularly in the Ganges Plain. A. G.

AFRICA

An African Survey : A Study of Problems arising in Africa, South of the Sahara. By Lord Hailey. *Price* 21*s.*

Science in Africa : A Review of Scientific Research relating to Tropical and Southern Africa. By E. B. Worthington. *Price* 10*s.* 6*d.*

Issued by the Committee of the African Research Survey under the auspices of the Royal Institute of International Affairs. London : Humphrey Milford at the Oxford University Press, 1938.

An African Survey is an attempt to take stock of what European governments collectively have done for Africa in the past, and of what problems remain for future solution in such fields as administration, justice, medicine, agriculture, economics and education. Although the collection of data for the Survey from sources difficult of access occupied Lord Hailey and a qualified staff of collaborators for at least five years, the impression has all the value of an instantaneous snapshot. It is photographic in its objectivity. Lord Hailey has

herein taken the first step towards the co-ordination of African studies on the continental scale advocated by General Smuts in his Rhodes Memorial Lecture of 1929, and we see for the first time the territories of Africa south of the Sahara (with a few exceptions) transfixed each at its present stage of development and in its present relation to the whole. Such a document will be of inestimable value to the social historian of the future ; but if it is true, as Lord Hailey suggests, that " the history of every continent is written clearly in its geographical features, but of no continent is this more true than of Africa," geographers will regret that for " The Physical Background " no fuller description should have been thought necessary than that possible in the compass of 15 pages out of a total of 1662. The very unequal progress with topographical surveys in the various territories may perhaps account for the absence of adequate maps from this volume.

Lord Hailey writes primarily as an administrator. His design is to compile a factual record which will enable one colonial staff to appreciate the progress of every other, and one nation to profit by the colonial experience of another. Thus the direct emphasis is on folk and their institutions rather than on the land, a study of which on the same broad continental basis might have imparted a feeling of underlying permanence to a record which as it stands speaks but of change. The rapidity with which European civilisation has been thrust upon Africa is, Lord Hailey would seem to suggest, the root of all evil in that continent, even of the man-induced erosion for which the systems of shifting cultivation and open grazing that are indigenous have in some quarters been held responsible. Each aspect of Man's activities, social, economic, scientific and administrative, is reviewed in a chapter or chapters, not only from the point of view of each territory and the attitude of all the governing powers in turn, but also in its dual application to the native and to the white populations. The experts will pronounce each on their respective specialisms, and when the canvas is so large it will not be surprising if in some cases their complaint is of a lack of complete accuracy of detail. Although the aggregate in its present form is intimidatingly bulky, few will dispute Lord Hailey's gift for the selection of what is essential. It is this gift, even if in the concluding summary chapter it has led to an indulgence in over-simplification that of itself is misleading, which is the unifying influence of the Survey and the quality in its Director which most admirably fitted him for the position.

The crying need is for more research and for more funds with which to prosecute it. Lord Hailey recommends the institution of a Bureau of Information for the purpose of making all present knowledge of African affairs more readily available ; and the endowment of a Directorate of Research with representation in each of the mother countries which would advise and co-ordinate our future efforts. Both institutions should ideally be international. For the former Lord Hailey's Survey, together with Dr. E. B. Worthington's supplementary report on *Science in Africa*, have already laid the foundation ; but only if we build quickly. Uncontrolled evolution in this " living laboratory," which Lord Hailey has in the main so faithfully described, will in places rapidly render it unrecognisable, in other places will crystallise with its present defects unremedied. Africa, particularly intertropical Africa with its leached lateritic soils and its subordination to insect-carried pest and disease, is a poorer continent than has frequently been supposed, and the success or failure of European colonisation therein must ultimately be judged not by what Europeans get out of it but by their effective contribution to the welfare of its inhabitants.

Dr. Worthington's book, which bears much the relation to the Survey of an amplified bibliography, is abundantly cross-referenced and is in the nature of a running commentary on the advancement of scientific methods the interest of which is not confined to students of Africa. Quite a cursory reading makes obvious how much of African research is done outside Africa, by the Imperial Bureau of Soil Science, for example, or the Royal Botanic Gardens at Kew. Dr. Worthington's plea for co-ordination and co-operation is based on deep insight into the interdependence and correlation of natural phenomena, and his

contribution is of no less value than the master volume in guiding geography to its source facts and in indicating future fields for research.

Capital Investment in Africa. By S. Herbert Frankel. London : Humphrey Milford at the Oxford University Press, 1938. *Price* 10*s.* 6*d.*

Although Professor Frankel's detailed and learned study of capital investment in Africa is intended primarily for economists, it contains much material of interest to geographers. The author deals with that part of the continent lying south of the Sahara, Egypt and Abyssinia. He shows clearly how geographical and ethnographical factors have retarded economic development. Before the last quarter of the nineteenth century, Europe's commerce with Africa was small. " Unlike the Indians or Chinese, Africans had practically nothing to offer and as little to demand, from the traders who visited them. The only trade of real consequence which could be developed for centuries was the slave trade, the export of Africans themselves—' a trade which destroys all others.' " But when gold and diamonds were discovered in the southern part of the continent capital from Europe was at last attracted and Africa quickly took its place in the world economy. Professor Frankel discusses the influence of physical and human geography upon problems of transport and health, and native and land policy. His book includes valuable statistical tables and is an indispensable work of reference for students of African affairs. W. O. H.

ARCTIC REGIONS

Unsolved Mysteries of the Arctic. By Vilhjalmur Stefansson. London : George G. Harrap and Co. Ltd., 1939. *Price* 10*s.* 6*d.*

Arctic history contains many unsolved problems on several of which speculation has been prolific. No man is qualified better than Mr. Stefansson to discuss the problems which he chooses. Four of them are of wide interest : the disappearance of the Norse colonies in Greenland has been variously attributed to Eskimo attack, malnutrition and racial absorption ; Mr. Stefansson weighs the solution in the balance. The Franklin disaster has been usually attributed to scurvy, a strange occurrence in a land well supplied with game. Andrée's death and those of his two companions on White Island form a newer mystery, for which Mr. Stefansson has a solution ingenious and yet credible. The disappearance of the Soviet Arctic fliers of a few years ago offered a difficult problem, and Mr. Stefansson even hints that one or more may still be alive. Lastly, there is the less familiar fate of Thomas Simpson a century ago.

This is a fascinating book which holds the interest like a closely reasoned detective story, and has the added charm of being written by a man who knows his background as well as his facts. R. N. R. B.

The Conquest of the Arctic. By Louis Segal. London : George G. Harrap and Co. Ltd., 1939. *Price* 10*s.* 6*d.*

Dr. Segal, a Swiss savant who was at one time head of the Russian Department at Birmingham University and has since been closely associated with the U.S.S.R. Government in London, is unequalled as an authority on the subject on which he has written. The book is of surpassing interest, both to the average reader and to the scientist. It begins with a short historical account of Arctic exploration and goes on to describe the results of recent exploration. Not unnaturally Dr. Segal gives most prominence to the conquest of the Arctic by the Soviet Government, although he gives full credit to the work done by both the United States and Canada. But it must be admitted that this cannot compare with that of the Russian Government, which has placed unexampled facilities and enormous funds at the disposal of the Departments connected with the development of the Russian Arctic, a territory of comparably enormous extent.

Towns and ports such as Igarka, with large populations and all the amenities of civilisation, have been established where a few years ago there was only desolate tundra. They are all connected by practically daily air services, and have complete medical, educational and other institutions. Not only this, but Soviet scientists have evolved agricultural products, vegetables and fruit which mature in the severe climate, and in no long time Russian Siberia should feed itself, even with its now large population.

The results of scientific investigation of the seas, winds and weather are of inestimable value to the northern hemisphere as a whole, and the author's description of the drift of Papanin and his companions with the ice from the North Pole to Greenland, where they were picked up by Russian icebreakers, reads like a Jules Verne romance. Among other theories which they were able to contradict was that there was no animal life above or under water at the Pole. It is now well known that a regular service of steamships is able every year to go from the West to the far East of the Siberian coast. This success has been due to years of patient investigation.

The book is well illustrated and is of great importance and interest. S.

OCEANIA

The Saga of "Cimba." By Richard Maury. London : George G. Harrap and Co. Ltd., 1939. *Price* 8*s.* 6*d.*

The *Cimba* was a five-ton schooner in which the author, with one companion, sailed from Nova Scotia by Bermuda and the Panama canal to various islands of the Pacific. Eventually the voyage ended in shipwreck on the Fiji Islands. Fortunately for Mr. Maury he is a real sailor : for that reason alone he survived, although he all but lost his life when the *Cimba* capsized in an Atlantic gale.

The sea and the business of sailing his schooner interest Mr. Maury rather more than the places at which he called. Often he is tantalizingly brief on the subject of his land excursions, but when he does expand, as on the Galapagos and Tahiti, he shows powers of observation and no little skill in description. All who love sailing in small boats and many who do not will find this a bright and entertaining book. R. N. R. B.

NEW EDITIONS

Our Natural Resources and their Conservation. Edited by A. E. Parkins and J. R. Whitaker. New York : John Wiley and Sons Inc. London : Chapman and Hall Ltd. Second Edition, 1939. *Price* 25*s.*

This most comprehensive survey of the conservation needs and policies of the United States has already been reviewed in this journal (vol. 54, 1938, pp. 118-119). Since its first appearance many rival publications have been issued, but it remains pre-eminent by virtue of its scope and the authority of its contributors.

The new edition is not substantially different from that of 1936. The authors have had an opportunity of reading the essays of their fellow-contributors, enabling them to avoid redundancy and to institute cross-references. Some have thought fit to add a paragraph or two on more recent developments. A new and valuable chapter on the fishing industries has been added by Dr. H. H. Martin of the University of Washington. It has been possible to revise statistical information to a limited extent only, but there are some significant indications of the increase of Federal expenditure on conservation measures since the inauguration of the New Deal. The bibliography has been arranged alphabetically, has been pruned of its more specialised references, and has been enlarged by the addition of some recent publications. G. B.

ANNUAL BUSINESS MEETING

The Annual Business Meeting was held in the Society's Rooms in Edinburgh on November 1st, prior to the Lecture by Dr. G. W. Tyrrell on " Mineral and Agricultural Development in the Soviet Union," The Right. Hon. Lord Salvesen, P.C., LL.D., presiding.

The Report of Council (see page 348) for the session 1938-1939 was submitted to the meeting, and on the motion of Mr. John Bartholomew, seconded by Mr. J. Collie, was unanimously adopted.

The Financial Statement (facing page 348) was submitted by Dr. James Watt who moved the adoption, and this was seconded by Mr. Thomas Yule.

The list of nominations of Office-Bearers recommended by the Council was then read as follows :—

That the Right Hon. The Earl of Rosebery, D.S.O., be re-elected President.

That Professor James Ritchie, D.Sc., F.R.S.E., be re-elected Chairman of Council.

That Mr. Alexander Good be elected Honorary Treasurer, in place of Mr. William Williamson who resigns.

That the previous Vice-Presidents be re-elected, and that the following serve on Council 1939-1940 : The Most Hon. The Marquess of Ailsa, J.P., D.L., F.R.S.G.S. ; Right Hon. Lord Salvesen, P.C., LL.D. ; Sir Robert Greig, LL.D., F.R.S.E. ; Principal J. Cameron Smail, O.B.E., F.R.S.E. ; Robert Grant, F.R.S.E. ; Miss Ella Christie, F.R.S.G.S.

That the following Members of the Society be elected to fill vacancies existing : Charles T. Macgregor, F.R.S.G.S. ; William Mair, F.R.S.E., F.R.S.G.S. ; R. L. Scarlett, C.D.A. ; H. M. Paton ; Lt.-Col. G. Dalyell of the Binns, C.I.E. ; Frederick Scrimgeour, M.D., O.B.E. ; George Robertson, M.A. ; Miss D. Yates ; Robert Kerr, M.A. ; Major G. Erskine Jackson, O.B.E., M.C., W.S. ; Allan Ross Stark. For Dundee —C. H. Marshall ; D. A. Cumming.

That the following be Chairmen of the Centres : Glasgow—Archibald Spiers, J.P. ; Vice-Chairmen, J. O. M. Clark and Norman Millar. Dundee—D. D. Taylor. Aberdeen—Sir Henry Alexander, LL.D.

That the other honorary Office-Bearers who have not resigned be re-elected.

It was also resolved to nominate A. W. Robertson Durham, C.A., Auditor, for re-appointment.

On the motion of Professor A. G. Ogilvie, seconded by Mr. R. P. Mathewson, the nominations were unanimously approved.

The Chairman took the opportunity of thanking the retiring Honorary Treasurer, Mr. William Williamson, who for two years had worked assiduously for the Society, and the following Members of Council who had completed their term of office : Miss I. W. Hutchison ; Mr. J. Y. Erskine ; Mr. A. R. Normand ; Mr. W. A. Whitelaw ; Dr. A. Macdonald ; Dr. D. Guthrie ; Sir Harold J. Stiles ; Mr. R. R. Walls ; Mr. W. C. A. Ross ; Mr. D. Air, Dundee ; and Mr. A. H. R. Goldie.

List of Legacies, Bequests, etc., received since the foundation of the Society

1889 £100 from the surplus of the Edinburgh International Exhibition 1886 to found a Medal for explorers.

1901 £1000 by Mrs. A. L. Bruce to found a Gold Medal in memory of her father, Dr. David Livingstone.

1905 Subscriptions for the endowment of the Chair of Geography at Edinburgh University, £1302, 19s. (This amount which included the accrued interest was transferred to the University Court in 1931.)

1908 Government Grant of £200 per annum in recognition of the Society's efforts to extend geographical education in Scotland.

1914 Bequest of £25 by Mr. T. Frame Thomson, C.E., London.

1920 Grant of £200 by Glasgow Corporation from funds of Scottish Exhibition of Natural History, Art, and Industry towards cost of special " Glasgow " issue of the *Magazine* for January 1921.

1920 Bequest of £500 from Dr. J. G. Bartholomew subject to life-rent. (Paid in 1937.)

1920 Grant of £25 by Scottish Spitsbergen Syndicate towards cost of Spitsbergen Map in April 1920 issue of *Magazine*.

1926 Anonymous donation of £500 as a Memorial to Dr. J. G. Bartholomew.

1929 Grant of £500 from Carnegie (U.K.) Trust Fund towards extension of Library and for bookbinding.

1930 Bequest of £100 by Dr. James Currie, Edinburgh, subject to life-rent. (Paid in 1939.)

1933 Bequest of one-third residue (subject to life-rent) of estate of Mr. Ralph Richardson, W.S., Edinburgh.

1934 Donation of £100 by Mr. J. Edward Touche, Edinburgh, towards cost of publishing *Early Maps of Scotland*.

1937 Donation of £105 by Mr. J. D. Monro, Edinburgh, to the Society's Funds.

1938 Bequest of £10 by Mr. J. Bentley Philip, Aberdeen.
Bequest of £500 by Mr. J. Edward Touche, Edinburgh.
Bequest of £100 by Mr. A. Geddes Scott, Edinburgh.

ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

REPORT OF COUNCIL

Fifty-fifth Session, 1938-1939

(1st October 1938 to 30th September 1939)

The Council submits the following Report :—

Ordinary Membership

The changes during the session in membership were as follows :—

On 1st October 1938		1499
New Members		79
		1578
Deduct by Death	43	
,, Resignation or lapsed	137	
		180
On the Roll on 30th September 1939		1398

This is divided into Edinburgh 841, Glasgow 317, Dundee 69, and Aberdeen 77. In addition, 70 reside in England and 24 abroad. The Life Members, 147, are included in the numbers above.

Student Membership

Transferred from Teacher Associate Membership	50	
New Members	4	
	54	
Deduct by Resignation	11	
		43

Honorary and Corresponding Members and Honorary Fellows

Honorary Members	5	
Honorary Fellows	4	
Corresponding Members	5	
		14
Total Membership		1455

76 Members who have been granted the Diploma of Fellowship are included among the Ordinary Members.

ORDINARY REVENUE AND EXPENDITURE ACCOUNT

For Year to 30th September 1939

1937-1938.			
£1699	Subscriptions— Ordinary Members	£1593 0 0	
9	*Less*—Paid in Advance, 1939-40	12 15 0	
£1689		£1580 5 0	
30	*Less* Geographical Assoc. Subs.	24 5 0	
£1659		£1556 0 0	
21	Associate Members	6 0 0	
£1681		£1562 0 0	
46	Life Membership, Diploma, and Entrance Fees— Portion applicable to Revenue	50 19 5	
200	Government Grant	200 0 0	
119	Dividends and Interests	122 17 6	
37	Income Tax Recovered	39 11 7	
	Transferred from A. Geddes Scott Bequest to meet Map cases and Tracing Table per contra	50 9 9	
		£2025 18 3	
38	Deficit for year	93 9 7	
£2135		£2119 7 10	

1937-1938.			
£443	Magazine—Expenses of Publication, etc.— Printing		£411 11 1
71	Illustrations		71 19 8
44	Wrappers, Miscellaneous, and Index		47 12 6
27	Maps		58 13 1
64	Postages		66 17 8½
£651			£656 14 0½
£116	*Less*—Magazines sold	£130 15 11	
34	Advertisement Receipts	53 10 9	
2	Index Sales	0 6 0	
£153		£184 12 8	
120	Estimated Value of Books Received	120 0 0	
£377			304 12 8
			£352 1 4½
£207	Rooms—Upkeep of— Rent, Taxes, and Insurance	£215 15 1	
81	Cleaning and Repairs	83 4 2	
25	Heating and Lighting	26 5 5	
£314		£325 4 8	
68	*Less*—Rents received for hire of Rooms	68 5 6	
246			256 19 2
£393	Lectures	£394 6 3	
72	*Less*—Received for Tickets sold	70 18 8	
321			323 7 7
£704	Salaries and Honoraria	£697 8 7	
31	Treasurer	31 10 0	
5	Auditor's Fee	5 5 0	
24	Superannuation Contribution	35 10 0	
764			769 13 7
179	Library—Books and other Furnishings, including estimated value of Books received		183 1 11½
98	General Printing		60 3 2
26	Stationery		20 0 8
22	Telephone—Rent, Calls, and Telegraphic Address		23 2 7
2	Addressograph		3 2 6
10	Medals		10 0 0
35	Postages		30 5 9½
7	Donations		2 2 0
4	Bank Overdraft Interest		2 16 6
	Map Cases and Tracing Table met from A. Geddes Scott Bequest		50 9 9
37	Miscellaneous		32 1 2½
£2135			£2119 7 10

BALANCE SHEET as at 30th September 1939

ASSETS

I.	Investments held by the Society—		
	Life Membership, Diploma and Entrance Fees Fund—		
	£512, 6s. 11d. 3½% Conversion Stock		£400 0 0
	£324, 18s. 11d. 4% Funding Stock		300 0 0
			£700 0 0
	General Funds—		
	£400 Dominion of Canada 3½% Registered Stock, 1930-50	£405 1 0	
	£2051, 3s. 3½% Conversion Stock	1484 14 6	
	£75, 4s. 8d. 2¾% Guaranteed Irish Land Stock	56 15 3	
	Dr. J. G. Bartholomew Memorial Donation—		
	£890 Guaranteed 2¾% Land Stock	500 13 6	
	Dr. J. G. Bartholomew Bequest—		
	£500 3½% Conversion Stock	500 0 0	
	J. E. Touche Bequest—		
	£560, 16s. 9d. 2¾% Guaranteed Irish Land Stock	£420 13 6	
	Early Map Stock	75 3 6	
	Cash in Hand	4 3 0	
		500 0 0	
			3447 4 3
II.	Glasgow Equipment Fund— Balance at 30th September 1939, on Deposit		77 2 0
III.	On Deposit Receipt, Commercial Bank of Scotland Ltd.		6 12 6
IV.	Cash Balance		3 8 0
			£4234 6 9

LIABILITIES

I.	Commercial Bank of Scotland		£298 5 5
II.	Accounts Outstanding		47 3 8
III.	Prepaid Subscriptions		16 15 0
IV.	Livingstone Medal Fund— Balance Due to Fund		1 16 4
			£360 0 5
V.	Funds of the Society—		
	(*a*) Life Membership, Diploma, and Entrance Fees Fund—		
	Diploma Fees—Balance at 1st October 1938	£50 1 4	
	Entrance Fees— Do.	215 3 4	
	Life Membership Fees— Do.	626 4 9	
		£891 9 5	
	Add—Sums received during Year	128 0 0	
		£1019 9 5	
	Less—5% whereof transferred to Revenue	50 19 5	
	Balance at 30th September 1939	£968 10 0	
	(*b*) Glasgow Equipment Fund— Balance at 1st October 1938	£76 5 11	
	Interest for Year	0 16 1	
		77 2 0	
	(*c*) General Account— Balance at Credit at 30th Sept. 1938	£2272 13 8	
	Add Bequests received during year— Jas. Currie Bequest £100 0 0		
	J. E. Touche Bequest 500 0 0		
	A. Geddes Scott Bequest £100, *less* Map Cases and Tracing Table met from that bequest £50, 9s. 9d. 49 10 3		
		649 10 3	
		£2922 3 11	
	Deduct deficit on ordinary revenue and expenditure account	93 9 7	
		2828 14 4	
			3874 6 4
			£4234 6 9

LIVINGSTONE MEDAL FUND

Funds at 30th September 1938—		
£1121, 18s. 4d. 3½% Conversion Stock		£921 7 5
Deposit Receipt, Commercial Bank of Scotland Limited		101 0 0
Commercial Bank of Scotland Limited, on Current Account		15 17 9
	£1038 5 2	
Income Received—		
Interest on Government Stock (*less* tax, £10, 15s. 10d.)	28 9 4	
Interest on Deposit Receipt	1 5 5	
Income Tax Recovered	9 3 8	
Interest on Irish Land Stock (no tax)	1 16 9	
	£1079 0 4	

Funds at 30th September 1939—		
£1121, 18s. 4d. 3½% Conversion Stock		£921 7 5
Deposit Receipt, Commercial Bank of Scotland Limited		55 0 0
On Current Account with Commercial Bank of Scotland Limited		0 6 2
£133, 15s. 6d. 2¾% Guaranteed Irish Land Stock		100 10 5
Balance on hand		1 16 4
	£1079 0 4	

DR. M. I. NEWBIGIN MEMORIAL

Funds at 30th September 1938—		
£312, 10s. 2¾% Guaranteed Irish Land Stock		£249 17 4
Due by General Fund		5 0 0
Do. Commercial Bank of Scotland on Deposit Receipt		6 6 10
	£261 4 2	
Income Received—		
Interest on Guaranteed Stock (*less* tax, £2, 7s. 2d.)	6 4 8	
Income Tax Recovered	2 2 10	
Interest on Deposit Receipt	0 0 3	
	£269 11 11	

Expenditure—		
Cash Prize and Medal awarded		£7 3 6
Funds at 30th September 1939—		
£312, 10s. 2¾% Guaranteed Irish Land Stock	£249 17 4	
Due by Commercial Bank of Scotland on Deposit Receipt	12 11 1	
	262 8 5	
	£269 11 11	

Edinburgh, 6th November 1939.—I have examined the Accounts of the Royal Scottish Geographical Society for the year ended 30th September 1939, of which the above is an Abstract, and compared them with the Vouchers and Instructions thereof, and I find the whole to be correctly stated and sufficiently vouched and instructed.

A. W. ROBERTSON DURHAM, C.A.

The Society's Medals

The following awards were made during the session :—

Livingstone Gold Medal for 1939.—The Right Hon. Lord Hailey, K.C.S.I., K.C.I.E., for his direction of the African Research Survey under the auspices of the Royal Institute of International Affairs, and for the report entitled " An African Survey " (1938), a work which may be expected to guide enlightened European policy in Africa in future years.

Mungo Park Medal for 1939.—E. B. Worthington, M.A., Ph.D., for his important share in the work of the African Research Survey under the auspices of the Royal Institute of International Affairs, and for his report entitled " Science in Africa " (1938), a work which may be expected to give a great impetus to research on an ecological basis in Africa.

The Society's Research Medal for 1939.—Herbert John Fleure, D.Sc., F.R.S., Professor of Geography and Anthropology in the University of Manchester, for his many original contributions to geography and anthropology and his furtherance of these sciences in the British Isles.

Newbigin Memorial Medal for 1938.—A. C. O'Dell for his essay on " A Geographical Examination of the Development of Scottish Railways." (See *S.G.M.*, Vol. 55, pp. 112 and 129.)

Scottish Universities Medal :—

Aberdeen University.—Duncan Ronald Macgregor, first place Ordinary Class, 1938-1939.

Edinburgh University.—Elizabeth Clerk Rattray, first in Geography (first course), 1938-1939.

Glasgow University.—Christina Marjorie Stobie, first place in the ordinary graduating class of Geography, 1938-1939.

Honorary Membership was conferred on Captain Angus Buchanan, M.C., a Fellow and Medallist of the Society.

Diploma of Fellowship

The Diploma of Fellowship was awarded to Mr. T. G. Philip, M.A., Head Master, Higher Grade School, Galston, Ayrshire, in recognition of work done for geographical study in schools.

Meetings of the Society

Twenty-two ordinary meetings were held : six in Edinburgh, six in Glasgow, five in Aberdeen, and five in Dundee.

These meetings were addressed by Sir John Anderson, on " Bhutan " ; Captain John Anthony, " The Malayan Forests " ; Major George M. Coombs, " Czechoslovakia " ; Lt.-Col. G. Dalyell of the Binns, " The Persian Gulf " ; The Rev. Launcelot Fleming, " The British Graham Land (Antarctic) Expedition, 1934-37 " ; Mr. Seton Gordon, " The Hebrides and their Wild Life " ; Mr. Erik Schacke, " Denmark To-Day " ; Mr. Lawrence R. Wager, " A Year among the Highest Mountains of Greenland."

The afternoon meetings were addressed by Captain John Anthony, " Forest Life in Malaya " ; Mr. John Bartholomew, " Ragusa and the Dalmatian Coast " ; Miss F. Copeland, " Belgrade and District " ; Major R. R. Evans, " Ceylon,

Ancient and Modern " ; Dr. E. Wyllie Fenton, " How Agriculture changed the face of Scotland " ; Rev. J. Arnott Hamilton, " Principality of Liechtenstein " ; James W. Herries, " Modern Egypt " ; Dr. A. C. Keay, " Glimpses of Iceland " ; Mr. Andrew Lyall, " The Isle of Mull " ; Mr. William Mair, " Scottish Mountain Indicators " ; Miss Ruth Raeburn, " The Charm of Venice " ; Rev. R. J. Walker, " From Chungking to Burma."

The Scottish Geographical Magazine

The *Magazine* has been published in alternate months throughout the year, the proportion of articles dealing with Scotland being maintained at slightly over one-third. A special feature has been the number of contributors interested in defining the field and content of geography, but the regional and physical sides have also been represented. There is every reason to believe that the discussions for which the pages of the *Magazine* provide have in the past indicated the interest and vitality of its supporters.

The Council desires gratefully to acknowledge its deep obligation to all contributors of articles, and to the following who have by their assistance with the reviewing of books or in other ways made possible the publication of the *Magazine* : Miss A. J. Atkinson ; Professor G. B. Barbour ; Mr. G. Bowen ; Dr. A. J. Brock ; Mr. G. Graham Brown ; Professor R. N. Rudmose Brown ; Captain D. B. Calderwood ; Mr. W. L. Calderwood ; Dr. R. Campbell ; Dr. J. M. Cowan ; Mr. P. R. Crowe ; Professor F. Debenham ; Mr. W. G. East ; Mr. K. C. Edwards ; Mr. J. Y. Erskine ; Major R. R. Evans ; Mr. H. Fairhurst ; Mr. S. C. Farrar ; Dr. E. Wyllie Fenton ; Mr. T. W. Freeman ; Dr. A. Geddes ; Mr. E. W. Gilbert ; the Rev. J. Millar Graham ; Mr. W. Grant ; Mr. J. Grieve ; the late Dr. J. Gunn ; Dr. D. Guthrie ; Mr. J. B. Hamilton ; Mr. A. Harrison ; Mr. W. O. Henderson ; Mr. J. S. Hobbs ; Miss H. C. Hog ; Mr. K. H. Huggins ; Mr. W. R. Kermack ; Miss A. M. C. Latham ; Mr. W. O. Leitch ; Mr. W. P. Livingstone ; Mr. S. G. E. Lythe ; Dr. A. Macdonald ; Mr. J. Mathieson ; Mr. A. A. Millar ; Mr. J. D. Monro ; Miss M. E. Newbigin ; Professor A. G. Ogilvie ; Mr. T. Ripley ; Mr. E. Schacke ; Mr. E. H. Sealey ; Mr. J. A. Steers ; Mr. A. Stevens ; Mr. J. F. Stewart ; Sir H. J. Stiles ; Miss E. J. Boog Watson ; Mr. C. B. Boog Watson ; Mr. J. A. Watson ; Mr. J. W. Watson ; and the following local members of the Geographical Association : Miss K. E. Cunningham ; Mr. A. J. Hunt ; Miss M. G. Leitch ; Miss B. Third ; and Miss D. Yates.

The Library and Map Department

Books borrowed.—During the session 4970 volumes were borrowed by members of the Society. This number included 170 volumes borrowed from the Glasgow Branch Library.

In addition, 102 volumes were lent out under the arrangement with the Carnegie (U.K.) Trust Scheme.

Additions.—During the session the following additions to the Library have been made : 486 volumes, 54 pamphlets, 66 reports, 4602 mapsheets, 69 charts and 12 atlases. Of the number of books added, 273 were received from publishers for review purposes, 201 volumes were presented and 12 purchased.

National Collection of Maps.—The following additions have been made to the Society's valuable collection of Early Maps of Scotland : Cowley's Map of the

Duke of Argyle's Dukedom 1734, presented by the Rev. William Gillies, Kenmore; Grassom's Map of Stirlingshire 1817, by purchase; and also a photostat of a Plan of the Barony of Williamstown, presented by Dr. James Watt.

Presentations.—The Director-General of the Ordnance Survey has presented the Society with the six-inch map of the whole of Scotland—4318 sheets—for the use of the Place-names Committee; the Director of the Disposal Board, War Office, 70 sheets of the first edition of the one-inch Ordnance Survey of Scotland; the late Dr. J. D. Gilruth, a photograph of an Everest group including Mallory and Irving; Mrs. J. F. Henderson, diary of A. Keith Johnston before his expedition into East Africa with Joseph Thomson, 1879.

The Council desires to record its thanks to the Dominion, Colonial, and Foreign Governments for official publications presented to the Library, and to the Directors of the Ordnance Survey, the Geological Survey of Scotland and the Survey of India; the Geographical Section, General Staff, War Office; the Disposal Board, War Office; the Military Operations and Intelligence, War Office; the Trustees of the British Museum; the Admiralty; the Geodetic Institute, Copenhagen; the United States Geological Survey, and the Edinburgh Geological Society.

The Council thanks the undermentioned private donors of books, maps, and other presentations: Mr. D. Colville; Mr. R. B. Clarke; Dr. E. Wyllie Fenton; Dr. Douglas Guthrie; Mr. David Haldane; Dr. F. M. Halley; Mr. J. Jackson; Miss A. B. Lennie; Mr. John Mathieson; Rev. James Meikle; Mr. D. G. Moir; Sir George Macdonald; Mr. T. G. Philip; Mr. A. A. Pinkerton; Colonel Rae; Mr. Robert Riddell; Mr. Erik Schacke; Mr. R. T. Skinner; Dr. D. Wallace Smith; Dr. J. B. Tyrrell (Toronto); Mr. C. B. Boog Watson; Mrs. M. M. Watson (Aberdeen); Mr. William Williamson; and Miss K. J. Wright.

Place-Names of Scotland

Considerable progress has been made with the recording and investigation of Scottish Place-names. "The Place-names of Berwickshire," by the Rev. J. B. Johnston, has been completed and will be published shortly, and Lanarkshire compiled by Mr. J. Pringle Miller, Bothwell, is near completion. The County of Angus was undertaken by members of the local Antiquarian Society, and the late Dr. J. D. Gilruth, a well-known Angus historian and antiquarian, had arranged to act as collator and editor. Several of the parishes have been completed and the work is now under the supervision of Mr. J. T. Ewen, O.B.E., of Pitscandly. Investigations of the place-names of Caithness, Clackmannanshire, Peeblesshire, Roxburghshire, Sutherland, and of the Islands of Islay, Tiree, Gigha, together with the Mull of Kintyre are in progress, the last under the auspices of the Campbeltown Antiquarian Society.

Representatives and Delegates 1938-39

Association for the Preservation of Rural Scotland.—Mr. J. Bartholomew, Edinburgh, the Society's representative on the Council; Prof. A. G. Ogilvie, Edinburgh; Mr. T. Miller, Glasgow; and Col. D. A. Tyrie, Dundee.

British Association Meeting (Dundee).—Miss L. R. Latham.

Bruce Memorial Prize Committee.—Prof. R. N. Rudmose Brown, and the late Mr. W. G. Burn Murdoch.

Carnegie United Kingdom Trust—General Council, Central Library for Students.—Mr. R. R. Walls.

Joint University Committee of the Royal Anthropological Institute—Mr. Robert Kerr.

Old Estate Plans Committee.—Mr. C. B. Boog Watson and Dr. Angus Macdonald.

National Committee for Geography.—Prof. A. G. Ogilvie.

National Trust for Scotland.—Prof. A. G. Ogilvie.

Norwegian Geographical Society, Jubilee Celebrations, Oslo, 27th Sept. 1939.—The Rt. Hon. Lord Salvesen.

Permanent Committee on Geographical Names.—Mr. J. Bartholomew.

Scottish National Memorial to David Livingstone Trust.—Prof. A. G. Ogilvie and Mr. W. Clarke Reid.

Bequest

The Society received the following bequest : the sum of £100 bequeathed in 1930 by the late Dr. James Currie, Shipowner, Leith, which was subject to life-rent.

Obituary

It is with deep regret that the Council has to record the loss to the Society of 43 members by death, among them Dr. John Gunn, Hon. Editor of the *Scottish Geographical Magazine* (see *S.G.M.*, Vol. 55, p. 112) ; Mr. Harry R. G. Inglis, a Fellow and Vice-President (see *S.G.M.*, Vol. 55, p. 173) ; Mr. W. G. Burn Murdoch, a Fellow and Vice-President ; Lady Salvesen, and Prof. Sir W. M. Ramsay.

W. G. Burn Murdoch, J.P., F.R.S.E.

At its Meeting on October 24th, the Council received with deep regret intimation of the death of Mr. W. G. Burn Murdoch, a Vice-President of the Society. The following minute was approved, and it was agreed that a copy be sent to Mr. James A. H. Burn Murdoch, his brother :

" We regret to record the death of Mr. W. G. Burn Murdoch, J.P., F.R.S.E., Scottish artist and traveller. Among his many travels one was to the Antarctic as medical assistant to the late Dr. W. S. Bruce, resulting in his publication of *Edinburgh to the Antarctic*. He also visited the Arctic in company with Mr. J. Mathieson and Professor Rudmose Brown. Mr. Burn Murdoch took a keen interest in all Scottish matters. He was a Fellow, a past member of Council, and a Vice-President of the Society, which he joined in 1904.

Dr. John Clarke, Aberdeen

Intimation was also made of the death of John Clarke, LL.D., Aberdeen, a Vice-President and member of the Aberdeen Committee. Dr. Clarke took a great interest in the work of the Society, presiding at numerous meetings, and his loss will be much felt especially by the Aberdeen executive. It was agreed that a message of sympathy be sent to Lady Alexander, his daughter.